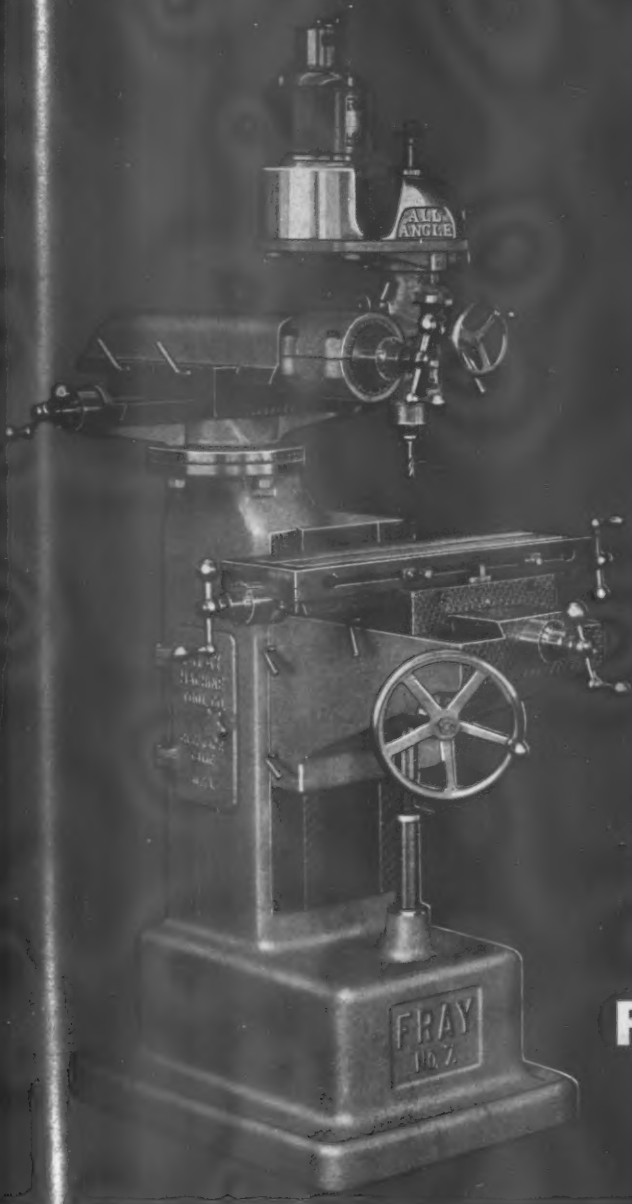
The
TOOL ENGINEER



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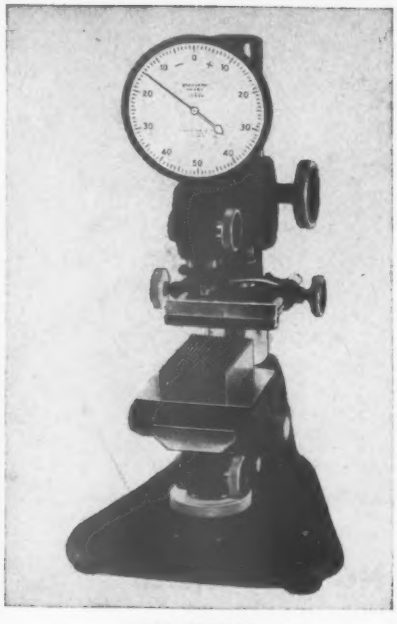

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THE TOOL ENGINEER

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ROY T. WISE

As Deputy Machine Tools Controller of the Department of Munitions and Supply in Canada, Roy T. Wise has much cause to concern himself with getting the most out of cutting tools. His article on this subject in next month's issue deals primarily with milling operations.

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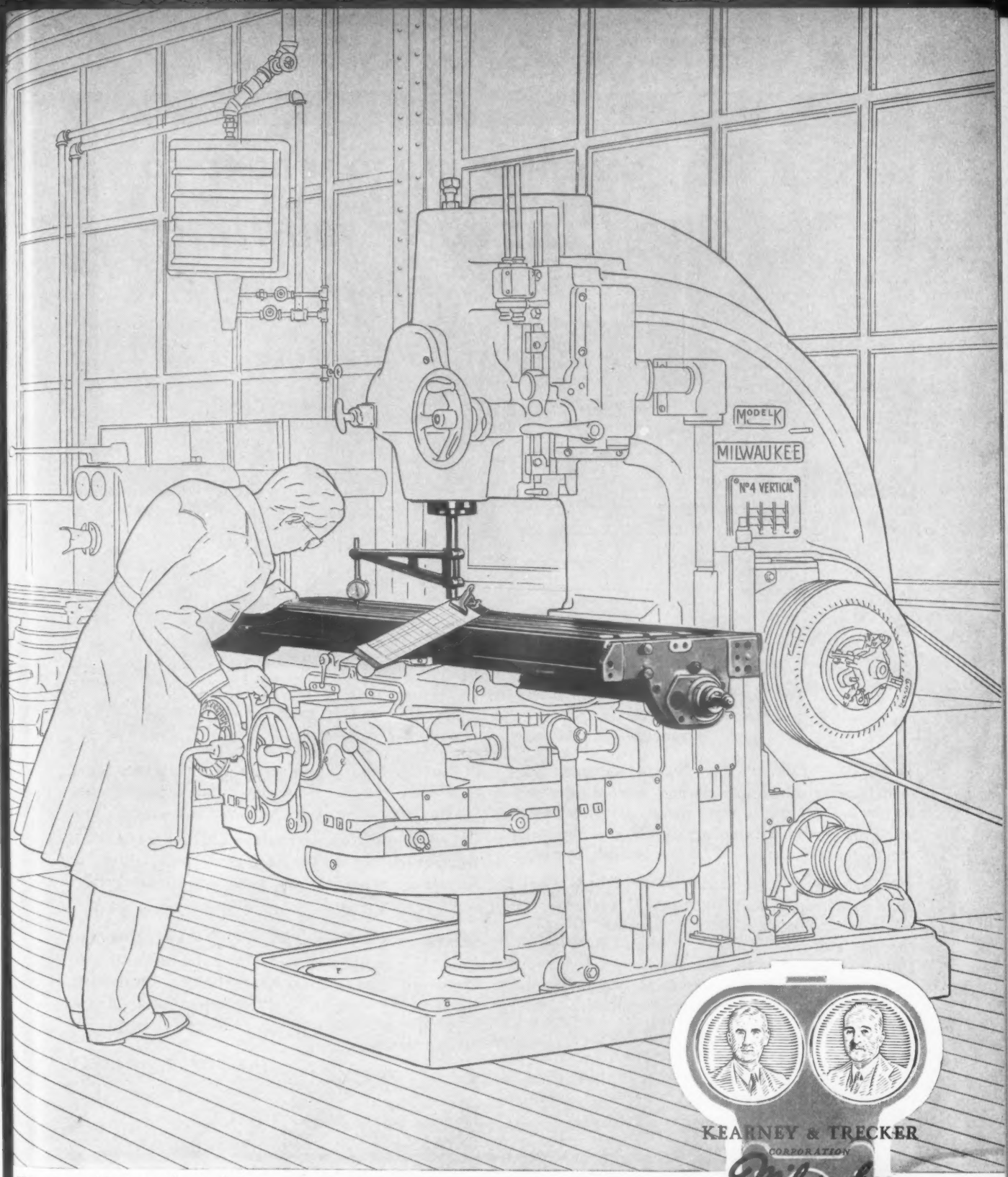

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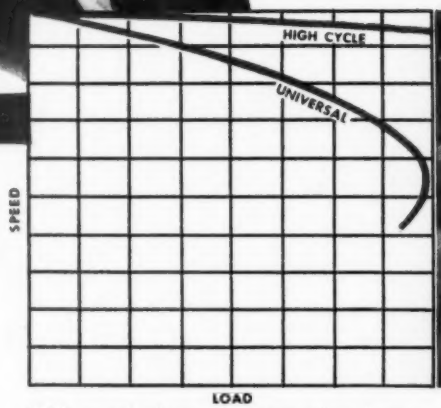
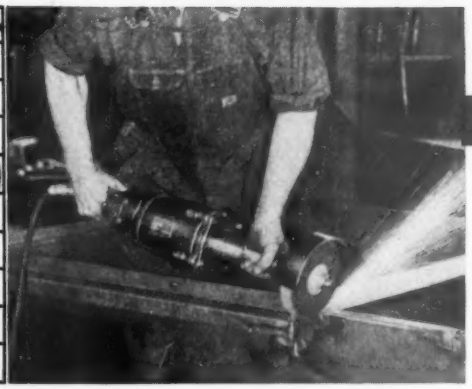
I cut their job-time in half

WITH HIGH-CYCLE





This graph shows the comparison between the performance of High-Cycle and universal types of tools. Note that the free speed of High-Cycle tools is much higher and that the speed drops only about 5% under load. Result: faster production.

Wanted: Better tool performance. This manufacturer of automatic scales wanted *faster production* from the same floor space, and they wanted to eliminate the maintenance troubles of their universal electric tools. Air supply wasn't available.

First. I checked the speeds of their tools. Found them operating at only 3000 R.P.M. and even less under load. Brought in my portable frequency changer and demonstrated a High-Cycle tool at 5600 R.P.M. Showed them how speed dropped only 5% under load. (See the accompanying graph.) Its simple design—no brushes, commutator, etc.—also appealed to them.

Results. They bought 13 Rotor High-Cycle Tools—sanders, grinders, and die grinders. Installed a compact 10 k.w. converter set in the basement—out of the way. It gave them reserve electric power for at least 5 more tools. Now they do all jobs smoother—*in half the time.* Sanding discs last longer, too.

A compressor for Air tools would have cost $2492; whereas the m.g. set for High-Cycle cost only $770. *Savings due to doubled output will pay for their investment in short order.*

Want High-Cycle FACTS? When should *High-Cycle* be used? When should *Air* be used? The easy-to-understand High-Cycle FACTS Book tells all. Why not write for your free copy? Call me in on your portable tool problems and get a sound, unbiased recommendation.

THE ROTOR ANALYST

The Rotor Analyst has 65 different Air tools and 59 different High-Cycle tools with which to solve your grinding, sanding, drilling, etc. problems.

THE ROTOR TOOL CO.

CLEVELAND, OHIO

PRODUCTION
ABOVE "CAPACITY"
with Vascoloy-Ramet Tools

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Tantalum-Tungsten Carbide Tools

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Where you cannot use cemented carbide, use

TANTUNG "G"

the new Miracle Cutting Metal (not a steel, not a cemented carbide) . . . most efficient at speeds about double those of high speed steel. Available in two styles and 65 standard sizes. Ask for information.

• "Capacity" of a machine shop is no longer measured by how many machines, how many operators, how many working hours. Increased capacity is achieved by increasing the productivity of the individual machines.

Vascoloy-Ramet tools have lifted the ceiling of "capacity" in hundreds of plants. With the same machines and operators, with no additional plant space, many of these plants are producing far beyond former "capacity" and getting out vital orders ahead of schedule.

All of this simply by getting more out of their machines with Vascoloy-Ramet tools.

There are probably some operations in your plant where "capacity" can be boosted with Vascoloy-Ramet tools. Why not talk it over with a Vascoloy-Ramet representative?

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2. Micromatic Manually Controlled Huttohones fulfill lower production needs with minimized equipment for any amount of stock removal desired.

3. Micromatic Automatically Controlled Microhones are specific purpose tools, for stock removal usually not exceeding .003" to .004" at rate of .001" per minute.

4. Micromatic Hydraulically Controlled Hydrohones and Drawfinishing Tools are specific purpose tools, for rapid stock removal up to .025" to .030" at rate of .010" to .012" per minute.

5. Micromatic Hydraulically Controlled Tubing Hones remove from .001" to .075" stock in bores up to 30" diameter x 75 feet long—at rates up to .012" per hour—generate accuracy within .0005" to .001".

6. Micromatic Hydraulically Controlled Hydrohones (with or without remote control) remove from .001" stock upwards in tubing and large diesel liners—at rates up to .012" per hour—generate accuracy within .001".

7. Micromatic Model 100 Hydrohoner with Automatic Microsize Control and Loading removes up to .002" or .003" stock in bores from ¼" to 1" diameter x 6" long—generates accuracy within .0001" to .0002" and size within .0005"—at rates up to 200-240 pieces per hour.

8. Micromatic Model 200 Hydrohoner removes up to .003" or .005" stock in bores from 1" to 2" diameter x 6" long—generates accuracy within .0001" to .0003"—at rates up to 120-140 pieces per hour.

9. Write for Bulletin AR-57: "Microfinish" and Bulletin AR-60: "The Micromatic Hydrohoner".

MICROMATIC HONE CORPORATION

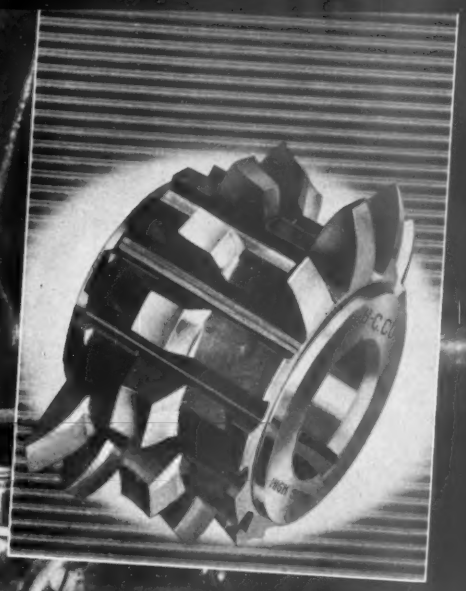
Production Honing Needs

MICRO MATIC

1345 E. Milwaukee Ave., Detroit, Mich., U. S. A.

PRODUCTION DOUBLED!

Hobbing 6 Deep Key-Slots in Shafts, with B-C Single Position Elongated Tooth Hob

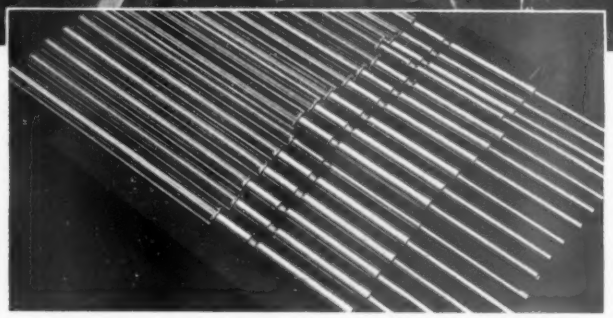


This Hobbing Application Freed Two Machines and Two Skilled Operators For Other Vital Work

The application of this B-C Elongated Tooth Hob to the job of hobbing deep key slots in turret lathe stop rods doubled production. Six slots 27" long x 1/2" wide x 1/4" deep in 2" diameter shafts are now hobbed on a Barber-Colman Hobbing Machine in 90 minutes floor-to-floor. The previous method required two machines and two operators. Now one man handles the job and also runs three other hobbing machines used on other work.

This deep slot hobbing is made possible by the patented B-C Single Position Elongated Tooth Hob. Its distinctive long teeth produce accurate straight-sided key slots. Sides of slots can be made parallel or radial, and the bottom concentric or flat as desired.

If you have work similar to this it may be possible to lower production costs or increase output by the use of the hobbing process. In addition it may free other machine tools for use on other vital work as in this case. Experienced Barber-Colman Hobbing Engineers will gladly cooperate with you on applications, without obligation. Just write.



Some of the shafts hobbed by this method, with key slots on the large end. B-C Elongated Tooth Hobs can cut key slots of almost any desired form. See page 38 in your B-C Catalog K.

BRIEF JOB DATA

Part — Turret Lathe stop rod; S.A.E. 1020 steel.

Hob — Barber-Colman (Patented) Single Position Elongated Tooth Hob; 4" dia. x 2¼" length with 1¼" straight bore; 12 gashes; ground form.

Hobbing Machine — Barber-Colman Long Bed.

Operation — Hobbing 6 deep key slots in stop rods; slots 27⅛" long by 0.498" — 0.502" wide, with 2.002" O.D. and 1.496/1.502" root dia. Climb cut.

Holding — Collet chuck on spindle, middle support bushing, center in outer end.

Feed — 0.030" per rev. of work.

Hob Speed — 66 r.p.m.

Production Time — 1½ hours per shaft, floor-to-floor.

Pieces per Grind — 6, single setting.

Remarks — Method formerly used on this job required two men and two machines. One hobbing machine now handles the entire output; and the operator also runs three other hobbing machines on different work.

BARBER B-C COLMAN PRODUCTS

HOBS, HOBBING MACHINES, HOB SHARPENING MACHINES, REAMERS, REAMER SHARPENING MACHINES, MILLING CUTTERS, SPECIAL TOOLS

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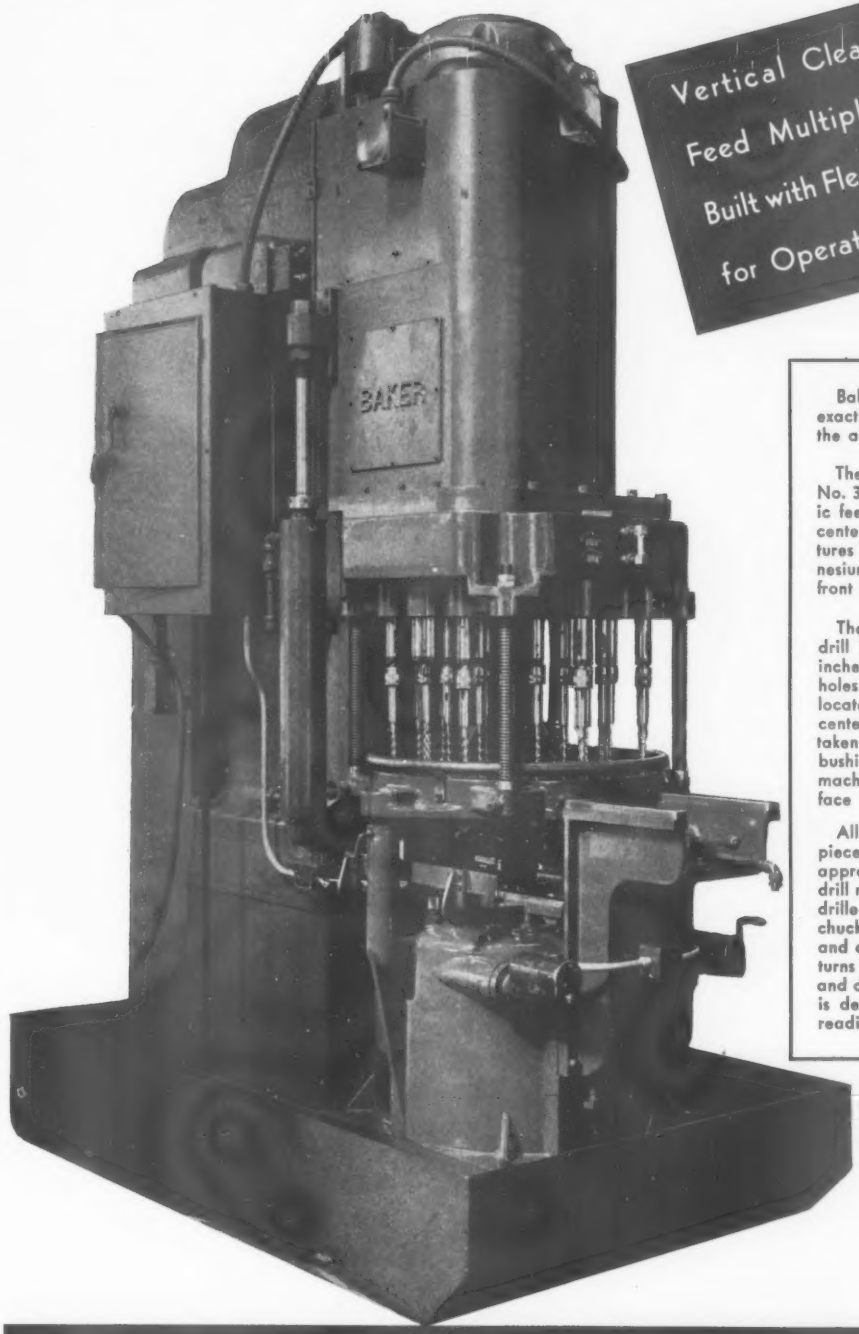
BAKER

Vertical Cleanline Hydraulic Feed Multiple Spindle Drillers Built with Flexibility for Retooling for Operations on Other Parts.



Baker machines are adapted to meet exacting production requirements of the aircraft industry.

The machine illustrated is a Baker No. 36-HO vertical cleanline hydraulic feed machine with 19-spindle fixed center multiple head with special fixtures for multiple drilling the magnesium casting supercharger-housing front of aircraft engines.

The operation problem is to multiple drill 13 through holes, diameter .3125 inches, and multiple drill 6 through holes of .5625 inches diameter. Part is located over center plug in fixture in center bore of part. Radial location is taken from dowel pin. The tool support bushing plate carried from head of machine clamps work from upper surface of supercharger-housing.

All holes are drilled through the piece, but the depth of the holes is approximately 5¾ inches. To hold drill run down to a minimum, holes are drilled from both ends. The operator chucks part with the front surface up and drills all holes ½ depth. He then turns the part over in the same fixture and drills the holes through. The fixture is designed so that the part can be readily turned over and rechucked.

Our Motto Since 1867:

"MACHINES: STURDY AND EFFICIENT, AS FINE AS CAN BE BUILT"

BAKER BROTHERS, INC., TOLEDO, OHIO, U.S.A.

We wish we could show you!

We wish you could see our plant right now. If you could, you'd understand, a lot better, why your orders have been delayed.

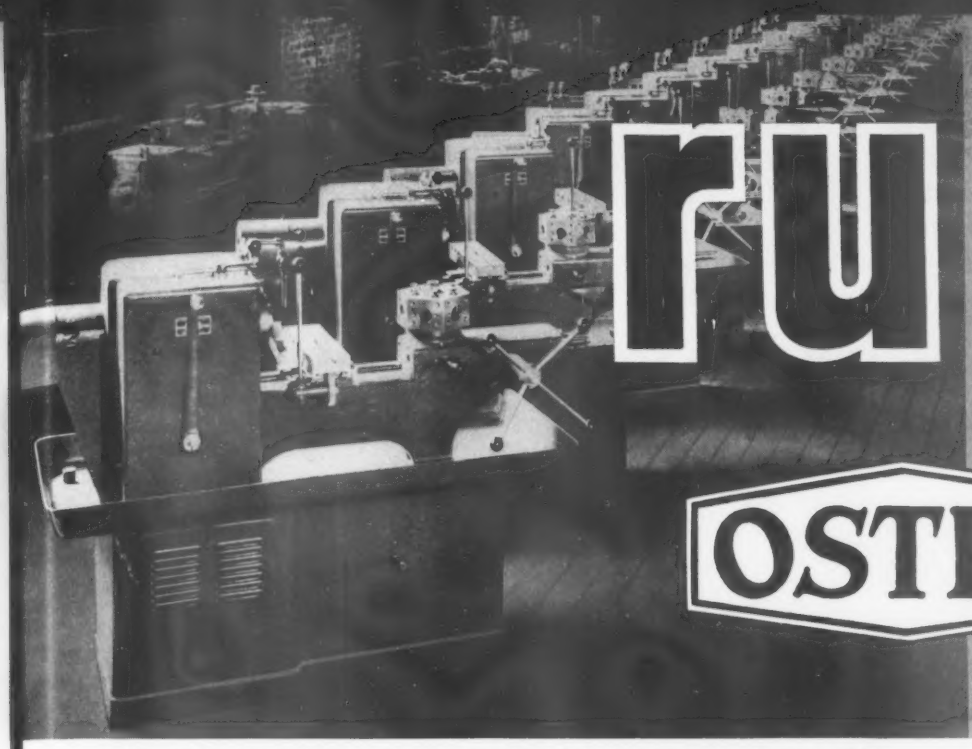
The situation is that our business is practically double that of last year! The rush of jobs caused by National Defense work really taxed our capacity. For a while, with all those extra orders pouring in, we were really "snowed under."

But as fast as we could, we've added more floor space—added more equipment—added more skilled men in every department. Now, with our increased plant capacity, and facilities, it looks like much clearer sailing ahead.

We want to tell all you loyal customers how much we've appreciated your helpful, cooperative attitude. We know that some of you were inconvenienced by our slow deliveries, and we're sincerely sorry. But we want you to know of our improved facilities, and to assure you that your orders will be taken care of just as efficiently and promptly as the national emergency will permit. And thanks again for your splendid cooperative spirit!

DAVIS BORING TOOL DIVISION

Larkin Packer Co., Inc., St. Louis, U. S. A.



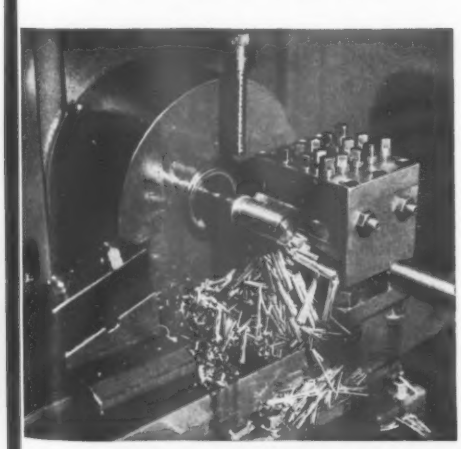
rush

You get it with the OSTER NO. 601 TURRET LATHE

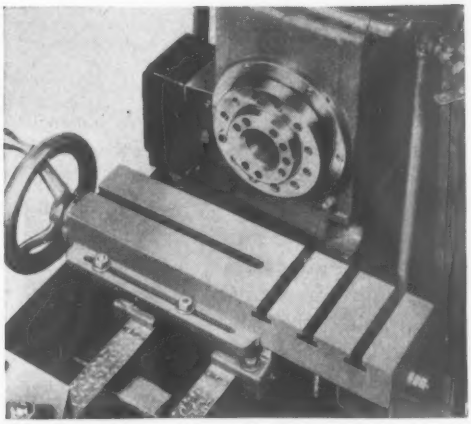
A battery of Oster No. 601 Turret Lathes offer exceptional flexibility in meeting simultaneous multiple operations on high production schedules with ability to divert one or more machines to emergency short-run operations at any time.

Where requirements call for 3 or fewer operations, the No. 601 can be furnished with a plain saddle instead of the six position turret.

The No. 601 equipped with the six position turret each face of which is tapped with six holes for mounting various sizes of tool holders.



Equipped with WORM DRIVE, the smooth flow of power permits unusually heavy forming cuts with absence of chatter.



Spindle nose of the machine is No. 6-A1 American Standard Flange Type ground to master gauges.

Chances are good that you need one or more Oster No. 601 Turret Lathes! Enlarged plant facilities completed recently by Oster make it possible to speed up deliveries on rush orders placed NOW!

You don't need highly skilled operators to man Oster No. 601 machines. They are simplified throughout. Equipped with hand lever-operated, six-position turret, the No. 601 is capable of performing a wide diversity of bar and chucking jobs.

The Oster No. 601 is a NATURAL for rapid training of new men and apprentices!

Versatile in meeting *your* needs *at least cost,* the No. 601 can be furnished with either WORM DRIVE in a range of spindle speeds from 71 to 1034 R.P.M., or with DIRECT DRIVE in a range of spindle speeds from 450 to 3000 R.P.M.

Other options include the machine equipped with six position turret or with plain saddle where three or fewer operations are required.

Illustrations and descriptions on this page are part of the complete details about the new Oster No. 601 covered in CATALOG 27-A. *Your* copy is waiting for you. Request us to *rush* it at once. Write:

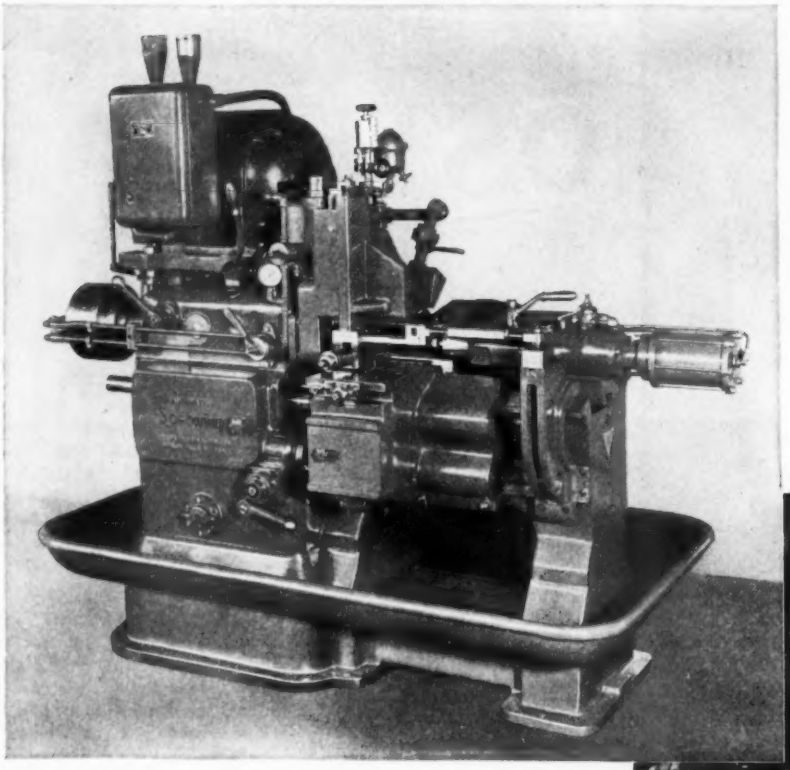
THE OSTER MFG. CO.
2063 EAST 61st ST. • CLEVELAND, OHIO, U.S.A.

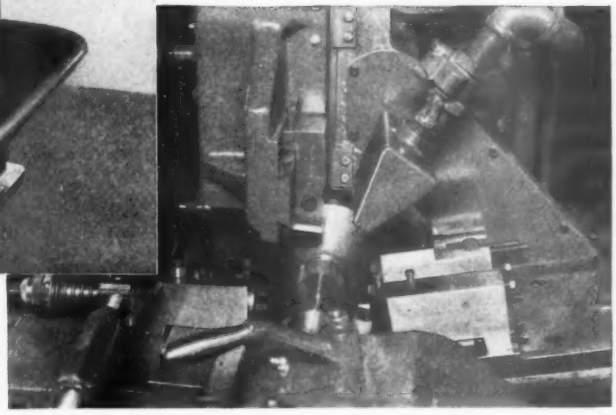
GET GOING AND KEEP GOING FASTER WITH AN OSTER

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

ROUGH TURNING 60 MM TRENCH BOMBS ON THE MODEL "LR" AUTOMATIC *Lo-swing* LATHE





Close-up view of tooling with chip cover removed from front carriage.

PROBLEM: To automatically rough turn 60 mm forged steel trench bombs previous to the cold nosing operation.

SOLUTION: The Model "LR" Lo-swing Lathe, equipped with a Third Slide, was selected for this job because of its sturdy, compact design and the fact that the third slide permitted simplification of the tooling and easier operation by unskilled labor.

Work comes to the machine centered at the boat-tail end. The bomb is held and driven with a three jaw, air-operated driver which grips the piece in the bore at the large end. A projecting stud fitted to the driver accurately locates the bomb longitudinally so that the correct wall thickness is maintained at its base when the small end is faced. This end is supported by a revolving center mounted in an air-operated tailstock quill.

The two outside diameters are turned with a 2-tool block on the front carriage—one mounted in a slide and controlled by a template machined to the specified taper. The radius and chamfer adjacent to the large diameter is turned with a constant profile tool mounted on the third slide or overarm. The open end is faced and the flange beveled with two tools mounted on the rear slide, while the boat-tail end is faced with a third tool. An additional taper-turning tool block can be mounted on the front slide when the long boat-tail is to be turned.

Model "LR" Lo-swing is completely automatic—the operator merely loads and unloads the bombs and operates the starting lever.

in Action
• Modern pursuit planes must have more speed and longer life. They must have the stamina to keep in action.
• Modern Cutting Tools too must have speed—long life—stamina. National Cutting Tools are meeting today's requirements "in action".

NATIONAL

NATIONAL TWIST DRILL & TOOL CO. DETROIT U.S.A.

TWIST DRILLS
REAMERS, HOBS
MILLING CUTTERS
COUNTERBORES
SPECIAL TOOLS

TWIST DRILL AND TOOL COMPANY

Home Office and Factory—DETROIT, MICH.

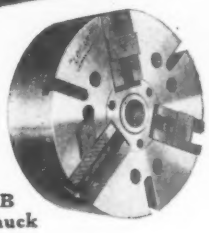
Tap and Die Division—Winter Brothers Co., Wrentham, Mass.

Factory Branches • New York • Chicago • Philadelphia • Cleveland • San Francisco • Distributors in Principal Cities

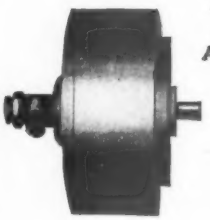
"LOGAN"

FOSTER FASTERMATIC with "LOGAN" AIR EQUIPMENT

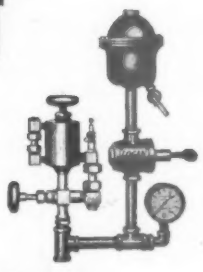
This new Foster platen type Fastermatic lathe is equipped with "LOGAN" Three Jaw Chuck and a Model "R" Rotating Type "LOGAN" Air Cylinder and Accessories. "LOGAN" Air Cylinders are designed to supply power efficiently and economically to all types of chucks and holding devices. "LOGAN" Chucks combine extra strength and rigidity with extreme compactness and light weight. "LOGAN" Representatives and "LOGAN" Engineers will be glad to make recommendations on your chucking problems.



Model 350-B
"LOGAN" Chuck



"LOGAN"
Model R
Air Cylinder



"LOGAN" Reducing Valve,
Air Filter, Gauge and
Lubricator Unit.

LOGANSPORT MACHINE, INCORPORATED

902 Payson Road — Logansport, Indiana

Manufacturers of Air and Hydraulic Devices, Chucks, Cylinders, Valves, Presses and Accessories

A *Phantom Gear* IN EVERY MONARCH LATHE

PRODUCTION BATTLES, in wartime or peacetime, are not won by factories or machines, alone. They're won by morale, by the courage and spirit and willingness of workers and management to put their heads and their hearts, as well as their hands, to this job of getting things done.

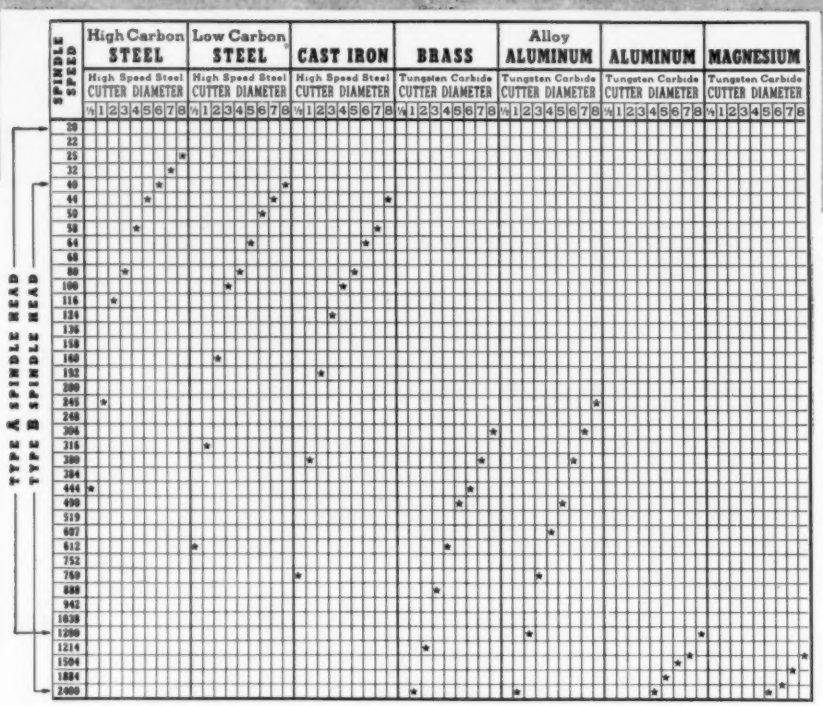
That spirit has always prevailed, here at Monarch. Being machine-minded, we express it in a production phrase, "*The Phantom Gear.*" Naturally, you won't *see* it in a Monarch lathe. But you'll *feel* its driving power, from improved design to critical inspection of every lathe we build . . . one every working hour.

This force which we call "*The Phantom Gear*" has been the inner urge of Monarch for more than 30 years. It stimulated our many pioneering improvements which have so broadened the scope of lathe work. Its power will continue as long as there's a Monarch—helping the thousands of owners and operators of Monarch lathes produce more goods for more people, at lower cost—and in emergencies, working for the defense of our Nation. The Monarch Machine Tool Company, Sidney, Ohio.

MONARCH LATHES

COVER THE TURNING FIELD

Engineered Productio


SPINDLE SPEED
High Carbon STEEL
Low Carbon STEEL
CAST IRON
BRASS
Alloy ALUMINUM
ALUMINUM
MAGNESIUM
High Speed Steel CUTTER DIAMETER
Tungsten Carbide CUTTER DIAMETER
⅛ 1 2 3 4 5 6 7 8
TYPE A SPINDLE HEAD
TYPE B SPINDLE HEAD
20 22 25 32 40 44 50 58 64 68 80 100 116 124 136 158 160 192 200 245 248 304 316 380 384 444 490 519 607 612 752 760 888 942 1038 1200 1214 1504 1884 2400

Note This Spindle-Speed Range!

Chart above indicates remarkable spindle-speed range of No. 1 Rigidmil. Stars show correct speeds for cutter diameters and materials named at top of columns. Note two optional ranges . . . Type A, 20 r.p.m. to 1200 r.p.m.; Type B, 40 r.p.m. to 2400 r.p.m.; with 74 changes to give you the right speed for any cutter up to 8" diameter, in any metal.

High-Ratio Heads . . . *60 to 1* is the ratio between highest and lowest speeds in Number 1 Rigidmil spindle-heads. Sundstrand exclusive design presents *unusually* high ratios, and large numbers of speed-changes, most economically in extremely practical and durable pick-off gear arrangements.

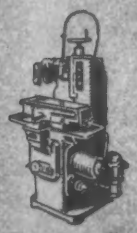
Feeds to Match . . . Sundstrand Hydraulic Equipment provides two optional *stepless* feed ranges for Number 1 Rigidmils; ½" to 31" a minute, and 1¼" to 55" a minute; in many different cycles.

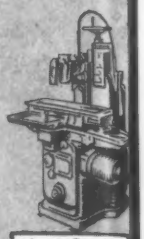
Plus Values . . . With speeds for every metal, and feeds to match, Number 1 Rigidmil gives you initial production speed with economy; *easy adaptability to future requirements, long-time protection for your original investment.*

Other Rigidmils . . . Smaller and larger Rigidmils also have exclusive Sundstrand high-ratio spindle heads and hydraulic feeds; and plus values.

Engineered Production . . . Sundstrand Engineered Production uses all the advantages of standard Rigidmils; designs semi-standard or special Rigidmils, fixtures, and tooling for you as required . . . does likewise with Automatic Stub Lathes on turning operations. Investigate, *today.*

Enlarged copies of chart above will be mailed promptly on request. Write your copy, today. Ask for Chart 31.

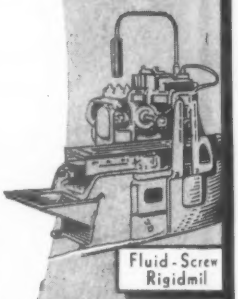

No. 00 Rigidmil

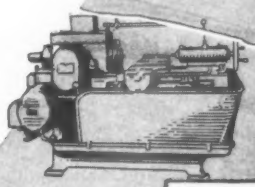

No. 0 Rigidmil

No. 1 Rigidmil

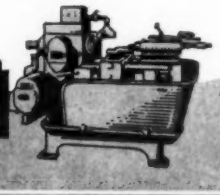
Get This Bulletin

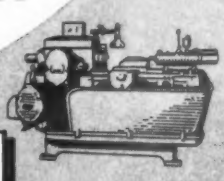
Bulletin 383 tells all about No. 1 Rigidmil; 382 describes No. 0; others give complete details of No. 00 and the Fluid-Screw Rigidmils. Write for copies, today.


Fluid-Screw Rigidmil


Model 12 Automatic Stub Lathe

Sundstrand Machine Tool Co.
2532 Eleventh Street, Rockford, Illinois, U. S. A.


Model 8 Automatic Stub Lathe


Model 10 Automatic Stub Lathe

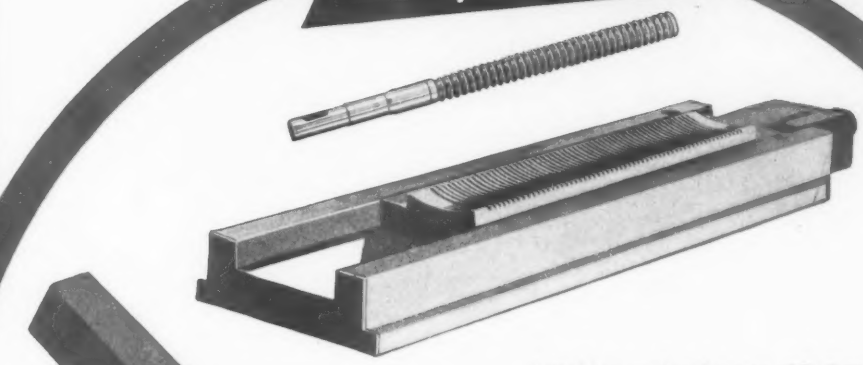
In their respective fields, Sundstrand machine tools are unexcelled for high production, accuracy, and lasting value. Write for complete details.

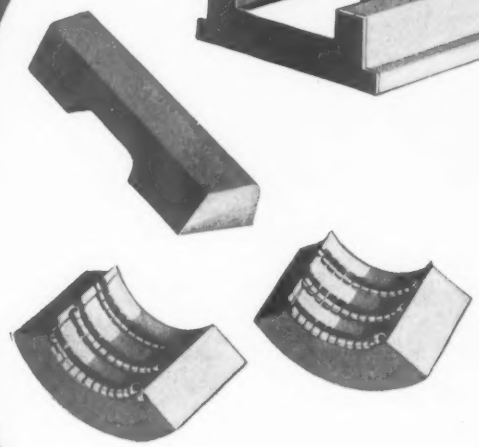
RIGIDMILS · STUB LATHES

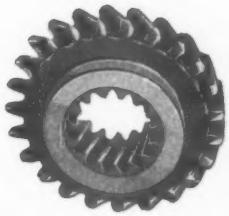
Hydraulic Operating Equipment — Drilling and Centering Machines

DON'T LAY OUT A BROACHING PROGRAM-

Without all the facts up to Last Night







Broaching practice, because of its importance in high production work, is developing faster than other phases of machining and faster, in fact, than its record is being written. Consequently, up-to-the-minute experience is vital to both speed and economy.

For instance, do you appreciate the savings in time and tool cost being made by the Red Ring Double Jump Broach (patented)?

Do you know the possibilities of the Red Ring method of multiple involute splines for universal joints and other machine elements, the operation of which demands a minimum of backlash or which must be designed with a high ratio of strength per unit of weight?

Are you familiar with what is being accomplished by Naloy tools in the field of hard gear broaching?

Do you know what Naloy steel for broaches and [illegible] tools is saving its users?

Today's defense program demands the ultimat[illegible]eed, quality and economy. Where broaching or [illegible]ool cutting is under consideration, consult Nati[illegible]roach engineers for the last word in modern [illegible]

NATIONAL BROACH AND MACHINE CO.

5600 ST. JEAN • DETROIT, MICHIGAN

FOR *Emphasis* ON SPEED! ··· USE SIMPLIMATICS

Look ahead...
keep ahead...
with Gisholt Improvements in metal turning

THEY'LL give you higher speed, of course! But also, their automatic operation has been so simplified that no particular skill is required to machine parts in larger quantities—within close limits of accuracy, and with fine finish.

Now, and in the busy years ahead, these Gisholt Simplimatics will take over more and more of the large-volume machining jobs—to release skilled hands and machines for other important work. It's a trend that is sound and inescapable.

It's high time to be thinking about these things—to be planning the faster, more efficient production that will reduce your manufacturing costs. Where quantities of parts run sufficiently large, Gisholt Simplimatics offer you many economies.

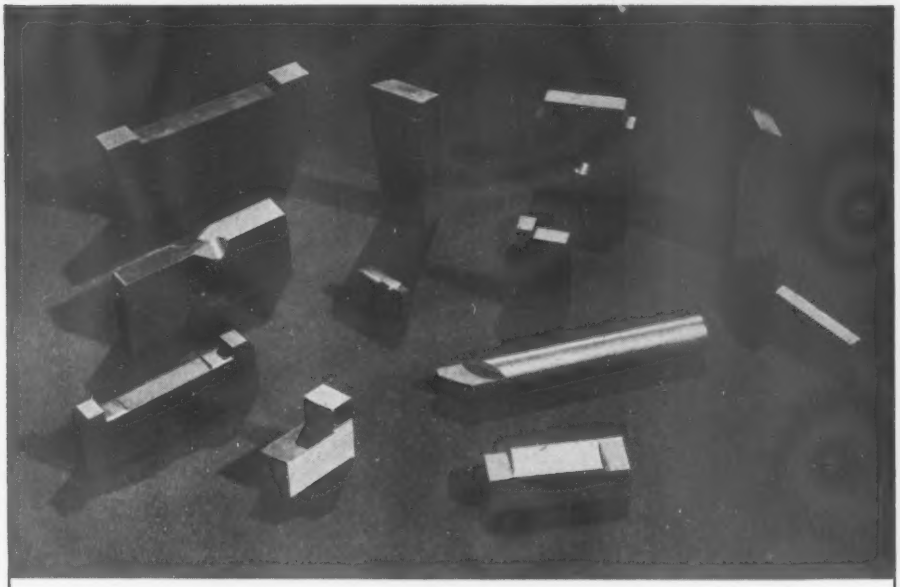
Gisholt engineers will gladly advise you.

GISHOLT

GISHOLT MACHINE COMPANY · 1229 E. Washington Ave., Madison, Wis.

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

USE HAYNES STELLITE TOOLS For Economical Production



Boring and Reaming Blades

Shown above are a few typical Haynes Stellite boring and reaming blades. Many other types are regularly cast and ground to users' specifications. These include solid bits, welded tip tools, milling cutter blades, brazed-in-blade shell end mills, grooving and form tools, spotfacers, and counterbores.

In addition, Haynes Stellite Company carries in stock for immediate shipment a wide range of styles and sizes of STANDARD bits, welded tip tools, and milling cutter blades.

Haynes Stellite tools are economical for machining practically all machinable materials except chilled cast iron and manganese steel. Some of the many operations for which these tools are efficiently used are: turning, boring, facing, milling, reaming, grooving, cutting off, forming, and spotfacing. Haynes Stellite tools can be depended on to cut at high speeds with long life between grinds—at a low cost per piece machined. Write or phone the district office nearest you for complete information about Haynes Stellite standard and special tools.

HAYNES STELLITE TRADE MARK

Red hard, wear-resisting alloys of cobalt, chromium and tungsten

HAYNES STELLITE COMPANY

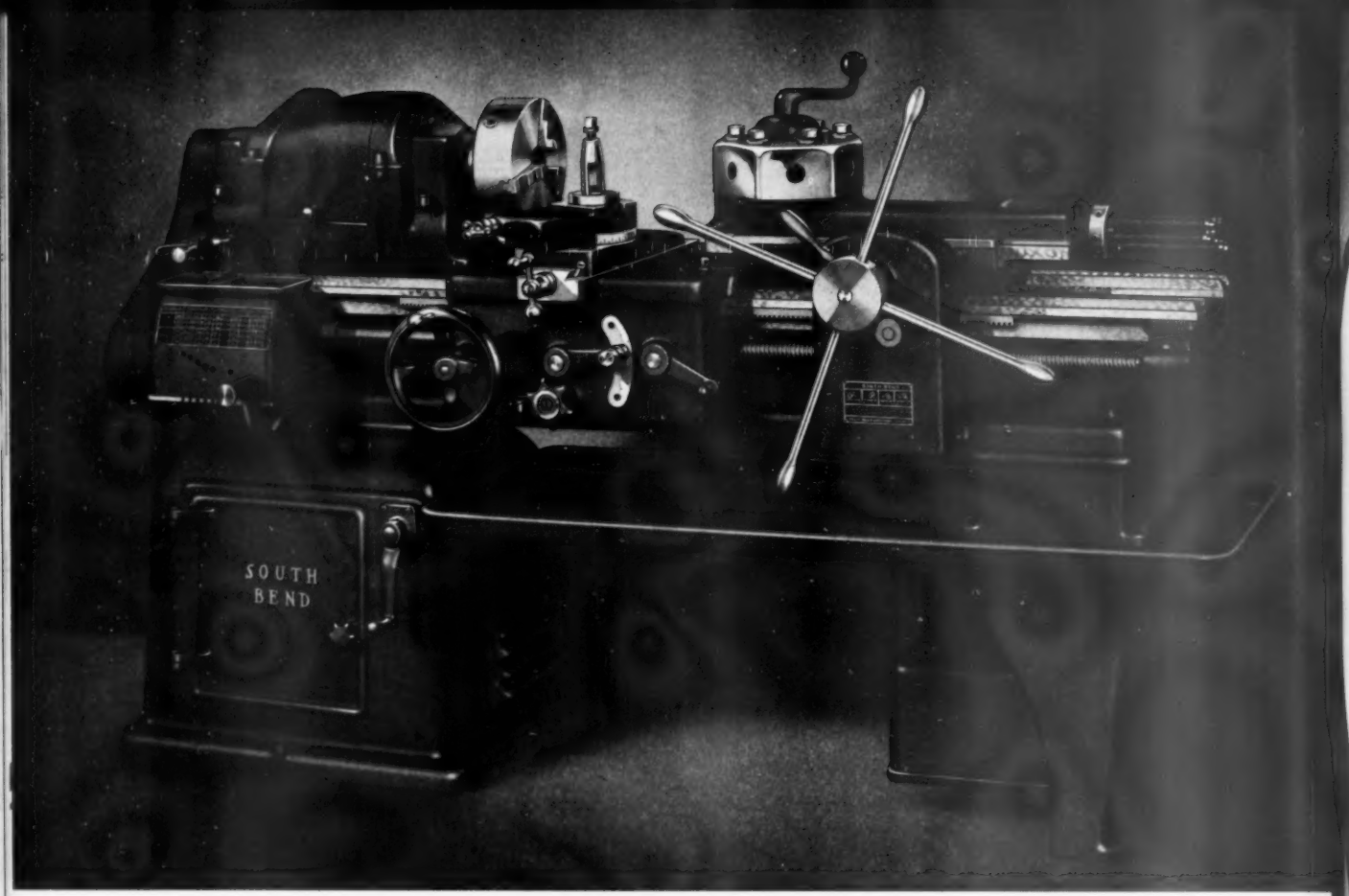
Unit of Union Carbide and Carbon Corporation

New York, N. Y. UCC Kokomo, Indiana

Chicago—Cleveland—Detroit—Houston—Los Angeles—San Francisco—Tulsa

• HIGH-PRODUCTION METAL-CUTTING TOOLS •

"Haynes Stellite" is a registered trade-mark of Haynes Stellite Company.



SOUTH BEND TURRET LATHES

For Rapid Production in the Defense Industries

THIS NEW South Bend 16″ Turret Lathe combines the precision and versatility of a toolroom lathe with the rapid production facilities of a turret lathe.

The power feed ram-type turret has six faces, with automatic indexing and individual stop for each face. The turret is mounted on the inside bed ways and may be clamped at any location the entire length of the bed.

The carriage has friction clutch drive for power cross feeds and power longitudinal feeds, also lead screw and split nut for cutting accurate screw threads. Mounted on the outer bed ways, the saddle wings clear the turret base to allow free movement of the carriage. Telescopic taper attachment, hand lever collet chuck and other attachments can be supplied.

The quick change gear box provides 48 changes for all carriage feeds and turret feeds. In addition, there is provision for changing the direction and speed of the turret feeds with relation to the carriage feeds.

The direct motor drive provides twelve spindle speeds ranging from 21 to 731 R. P. M. Headstock spindle has 1⅜″ capacity for bar stock. Rapid acting hand lever collet takes up to 1″ round stock.

In addition to this turret lathe we manufacture a complete line of back-geared screw cutting lathes, 9″ to 16″ swing, for toolroom and general shop use. Also 9″ and 10″ swing lathes with hand lever bed turret. Our factory is equipped to make prompt delivery on priority rated orders. Write for dealer's name.

TRADE MARK SOUTH BEND ENGINE LATHES

SOUTH BEND LATHE WORKS

Lathe Builders For 35 Years

926 East Madison Street — South Bend, Indiana, U. S. A.

LET'S GO! U.S. KEEP 'EM FIRST

Announcing

THE NEW OZALID MODEL "B"

A WHITEPRINT MACHINE FOR *FASTER* PRINT MAKING

THE NEW Ozalid Model "B" Whiteprint Machine—with printing speeds up to 20 feet per minute—gives you *faster* print production in a medium priced machine . . . a machine designed to meet your demand for mass print production at an economical cost!

In the Model "B" has been incorporated the latest improvements in print making, combining exposure and dry development in one compact unit to turn out finished whiteprints, dry and ready for immediate use, in double quick time! Synchronized printing and developing, and automatic separation of print from original contribute to the speed with which the prints are turned out.

Distinctive features include a specially designed blower hook-up, enabling the operator to regulate the temperature of the printing cylinder. This permits the operator to print, with equal ease, the complete line of Ozalid materials from air mail weight paper to heavy acetate foil. There is also front or rear delivery of prints. A fluorescent light illuminates the front print delivery tray and feed board. This light also enables the operator to check prints for correct printing and developing when employing rear delivery.

The Model "B" uses Ozalid's complete line of standard sensitized materials, transparent materials and specialties, producing positive-type prints. Duplicate originals are made just as the whiteprints, requiring no extra equipment.

The machine allows the interchangeable use of cut sheets and continuous yardage. It occupies only 19 square feet of floor space—conveniently fits into any drafting room, plant or office—and requires but a single operator.

With this machine you get an economical, convenient and direct way of making positive-type whiteprints. Write today for detailed literature describing the new Ozalid Model "B"—the "fastest" word in dry developed print making!

OZALID PRODUCTS DIVISION
GENERAL ANILINE & FILM CORPORATION
JOHNSON CITY, N. Y.

Ozalid in Canada • HUGHES OWENS CO. LTD., Montreal

After the rush is over!

Typical picture in American industry *today*—a battery of Ex-Cell-O Standard Precision Boring Machines turning out various defense parts with extreme accuracy, on a high production, low unit cost basis. *Tomorrow*, these same standard Ex-Cell-O machines—each of which is built for flexible use and ease of operation in precision work—will prove profitable to their owners when the swing over to non-defense products *must* be made.

Sweet music to the ears of today's buyers of Ex-Cell-O precision machines will be the steady sound of those same machines in operation *tomorrow* . . . when world peace will bring a definite advantage to manufacturers in this country whose present equipment can be adapted to civilian needs, quickly and profitably, and still meet the new high standard of speed and accuracy in production.

Every standard Ex-Cell-O machine—for boring, for grinding threads, for other precision machining—is designed and built to do most efficiently and at low cost the extremely accurate job demanded today for defense . . . to meet these same exacting requirements that will unquestionably be essential tomorrow if profits in competitive markets are to be assured.

Wherever an Ex-Cell-O precision machine is installed today, one of the most important steps in the planning for the inevitable tomorrow is already taken.

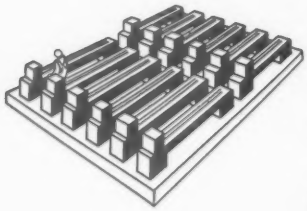
EX-CELL-O CORPORATION • DETROIT, MICHIGAN

XLO

Precision THREAD GRINDING, BORING AND LAPPING MACHINES, TOOL GRINDERS, HYDRAULIC POWER UNITS, GRINDING SPINDLES, BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS, PARTS

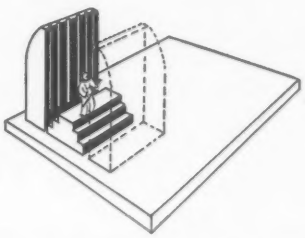
Don't worry a hole through a barrel

The old and the new



Sketch to the left illustrates 12 single spindle horizontal rifle barrel drilling machines and relative amount of floor space required. Most single spindle machines have been replaced with two spindle, or multi-spindle machines.

Sketch to the right illustrates two of our six spindle vertical rifle drilling machines and savings of 85% in floor space over 12 single spindle machines.



One operator, with two of these six spindle units, can drill approximately 12 rifle barrels in 40 minutes. Walking area of the operator is minimized, making it possible for him to observe the progress of each drill.

Each of the six spindles is provided with individual hydraulic actuation and operates independently of the other spindles. Any drill breakage or trouble experienced on one drill does not hamper the performance of the others.

Complete information is included in our rifle drilling folders . . . write for your copies.

ELI WHITNEY had a lot of brilliant ideas. Back in 1798 his ideas for jigs and fixtures and Division of Labor made possible the manufacture of interchangeable rifle parts. But, although this ingenious donation to industry simplified manufacturing and increased production on most rifle parts, drilling the barrels has remained a tough job and cause for worry. Today the old problem and worry bobs up again. Men, who never worked on gun barrels before, are now presented with unfamiliar drawings and urged to get this work done quickly and accurately.

One manufacturer of automotive parts was given the job of producing machine guns of .30 and .50 caliber. Experienced in mass production methods, and anxious to eliminate a moss-backed worry, he put the problem up to us. The results of our work with him are described to the left.

Finding solutions to knotty production and machining problems is our business. We've done a lot of machine designing for both low and high production, and no matter what your product, if your manufacturing includes drilling, boring, tapping, milling, or honing, you may find it profitable to use our special machine design service. More proof of the success of this method for *getting work done* is illustrated in our 3 Point Design bulletins . . . may we send yours?

ROCKFORD W.F.&JOHN BARNES ILLINOIS

• • A LEAF OR TWO FROM THIS BOOK

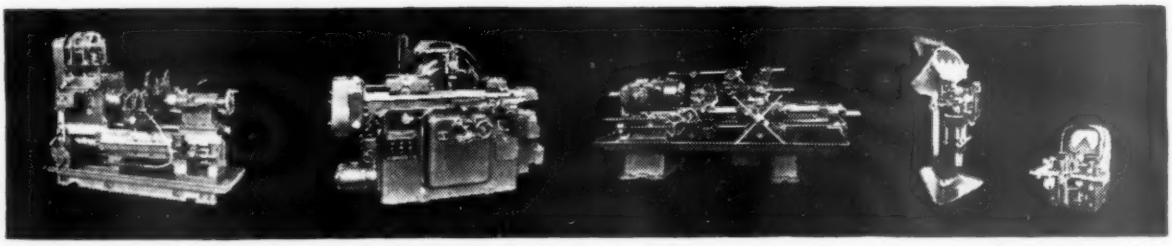
PROFIT PRODUCING MACHINE TOOLS

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers.

HISTORY'S lessons show us clearly that it pays to look ahead — not merely one step ahead — but a step beyond that. Today everyone agrees our first objective is victory. Versatile, rigid, precise and highly productive Jones & Lamson equipment will speed our war efforts — and tomorrow, when this emergency is over, your same Jones & Lamson machines will enable you to take the next logical step — toward sound peacetime profits based on rock bottom production costs.

JONES & LAMSON MACHINE CO.

SPRINGFIELD, VERMONT, U. S. A.



Fay Automatic Lathes

Automatic Thread Grinders

Ram & Saddle Type Universal Turret Lathes

Optical Comparators

A NEW MODERN HIGH SPEED

6" x 18" SURFACE GRINDER

A NEW MACHINE IN A WELL KNOWN LINE

Thompson

TYPE F

TOOL ROOM GRINDER

Available Now!

Control panel inclined at most effective visual angle for fast convenient operation includes Hydraulic Table movement throttle, Hydraulic Head movement throttle and table reverse lever. Head and table movements are instantly variable at the touch of the operator at all times.

With micrometer stop graduated in .0001" located above elevating hand wheel average skilled operators can grind to extremely close limits. *Illustration shows large quickly read graduations which assure easy, fast and accurate service.*

Two speed motor and 12" x ½" grinding wheel change from 1750 to 3450 R. P. M. by button on guard interlocked with wheel diameter to prevent over speeding.

Pressure lubricated table ways and double length box type bed with no table over hang maintain greater accuracy for any size work up to the rated capacity.

This modern machine will help to solve many of your manufacturing problems. Its extremely high speed—its unusual ability to work to limits of less than .0001" and its outstanding versatility place it in a field of its own. For production schedules or extremely accurate tool room work the Thompson Type F Grinder meets the demand for speed and more speed.

THE Thompson GRINDER CO.

SPRINGFIELD, OHIO

MANUFACTURERS OF HYDRAULIC SURFACE GRINDING MACHINES - ROTARY GRINDING MACHINES FULL AUTOMATIC AND HAND OPERATED - MACHINE TOOL WAY GRINDERS - SLOT GRINDING MACHINES - SPLINE GRINDERS - SPECIAL AIRCRAFT GRINDERS

FORCED MARCH...

... hour after hour, night and day, workheads are spinning for defense. For the vital tools at these workheads, you cannot set your quality standards too high.

MORSE THERE IS A DIFFERENCE **TWIST DRILL AND MACHINE COMPANY**
NEW BEDFORD, MASS., U. S. A.

NEW YORK STORE: 130 LAFAYETTE ST. - - - - CHICAGO STORE: 570 WEST RANDOLPH ST.

93% of Consolidated Brass Co.'s Carboloy Requirements

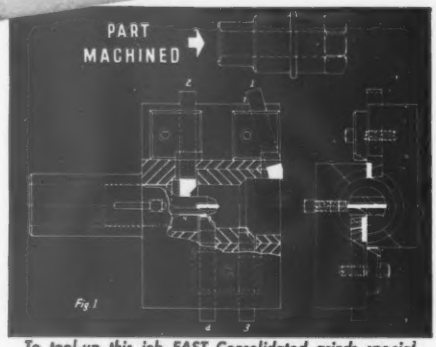
—are adapted—in their crib—from this one style of Standard Tool

To get the fastest possible service on special carbide tools, many leading plants today are maintaining nominal stocks of Carboloy Standard Tools and grinding these to meet special requirements whenever necessary.

Carboloy Standard Tools are manufactured by Carboloy in "mass production" quantities and are always available faster than specially shaped tools. Produced in 10 styles, Carboloy standards can be quickly reground in your tool room for use on 60%-80% of all turning, facing, boring operations on steel, cast iron, non-ferrous metals and non-metallics.

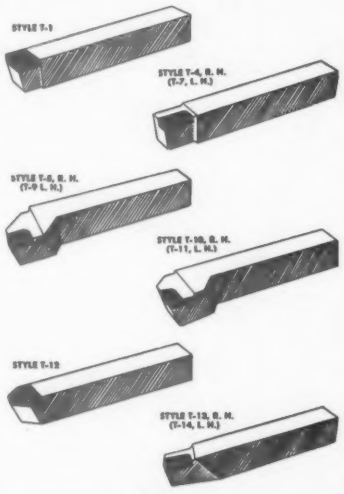
At Consolidated Brass Co., Detroit, for example, a survey showed that one style of "Standard" (Style 1) in just two sizes, was adaptable to 93% of their total Carboloy tool requirements. These are stocked by them . . . ready, at a moment's notice, to be ground to special shapes desired, in Consolidated's tool room. As a result, there are no delays awaiting special tools. Jobs are tooled up FAST, whenever needed.

This may be the answer to faster tool-ups on your jobs. Write for Catalog GT-129.



To tool-up this job FAST Consolidated grinds special shapes in Style 1 Carboloy Standards. The drill is a standard Carboloy Masonry Drill.

Use these Carboloy Standard Tools for 60%-80% of all turning, boring, facing jobs.

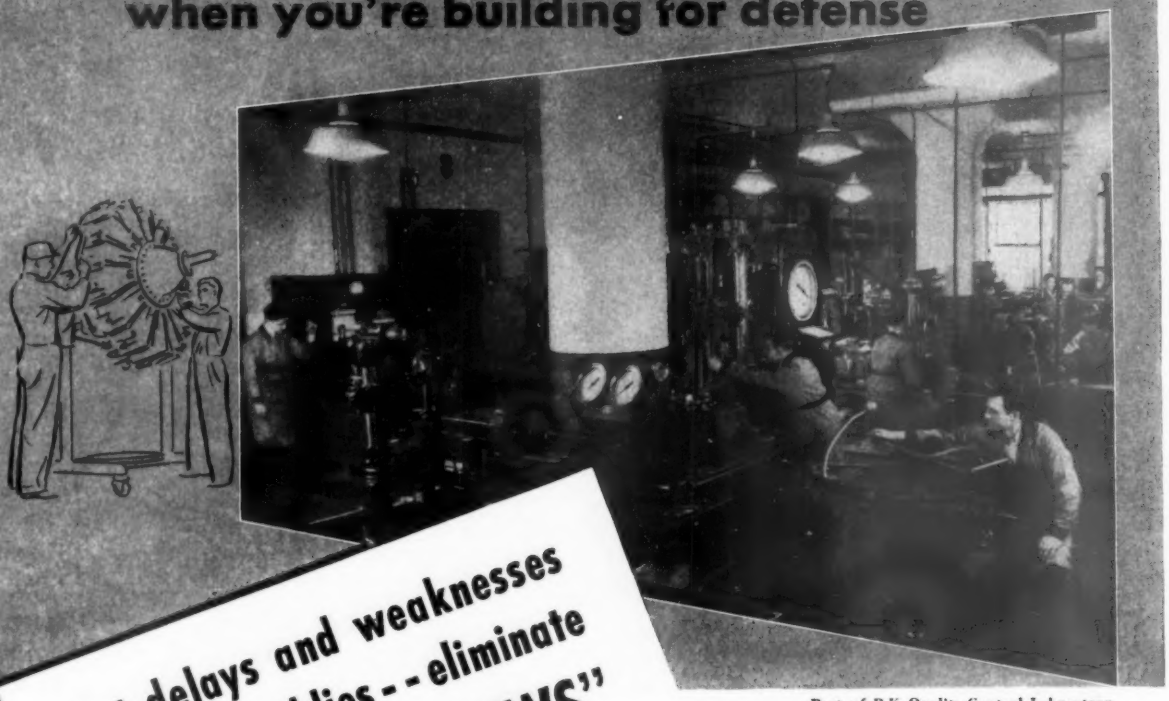


CARBOLOY COMPANY, INC., 11145 E. 8 MILE ROAD, DETROIT, MICH.
Chicago · Cleveland · Los Angeles · Newark · Philadelphia · Pittsburgh · Worcester, Mass.
Canadian Distributor: Canadian General Electric Co., Ltd., Toronto, Canada

CARBOLOY STANDARD TOOLS & TIPS
"You ALWAYS Get Standards FASTER Than 'Specials'"
CATALOG GT-129
SEND FOR FREE CATALOG

Doubts are out

when you're building for defense



Part of P-K Quality-Control Laboratory

Cut delays and weaknesses from assemblies--eliminate "DOUBTFUL SCREWS"

Parker-Kalon is at peak production to supply defense plants. But even so, the unique Parker-Kalon Quality-Control Laboratory still exercises rigid quality-control over Parker-Kalon Socket Screws! Eliminates "doubtful screws"—screws that *look* all right but some of which fail to work right. This quality-control is assurance of strong, tight fastenings on any product where you use P-K Screws. It's further assurance of assembly work uninterrupted by stops and delays caused by "doubtful screws". It's extra protection at no extra cost! Parker-Kalon Corp., 190-198 Varick Street, New York, N. Y.

PARKER-KALON

Quality-Controlled

SOCKET SCREWS

Give the Green Light to Defense Assemblies

Quality-Controlled

16-point test and inspection routine covers: Chemical Analysis; Tensile and Torsional Strength; Ductility; Shock Resistance under Tension and Shear; Hardness; Head diameter, height and concentricity; Socket shape, size, depth and centricality; Class 3 Fit Threads; Clean-starting Threads.

What is the TRUE MEASURE of Tool Performance?

Is it the ***number of pieces*** the tool produces during its lifetime? Or is it the total output of the machine or press ***within a given period of time?***

The true measure of tool performance is not ***how many*** pieces a tool will make, but ***how quickly*** it will make them. Almost anyone could make a blanking die heavy enough to produce a million pieces, with frequent regrinding. The trick is to make a million-piece die requiring ***no*** regrindings . . . or at the most, only one or two. The real secret of high production is ***uninterrupted*** production.

And that calls for top tool performance, perfect design, expert tool making, careful steel selection and exact heat treating procedures. Right there is where Carpenter can be of real help to you, with a simplified program providing an improved method of tool steel selection and correct heat treating data. This simplified Carpenter program has often saved as many as 60 hours per month on ***one machine.***

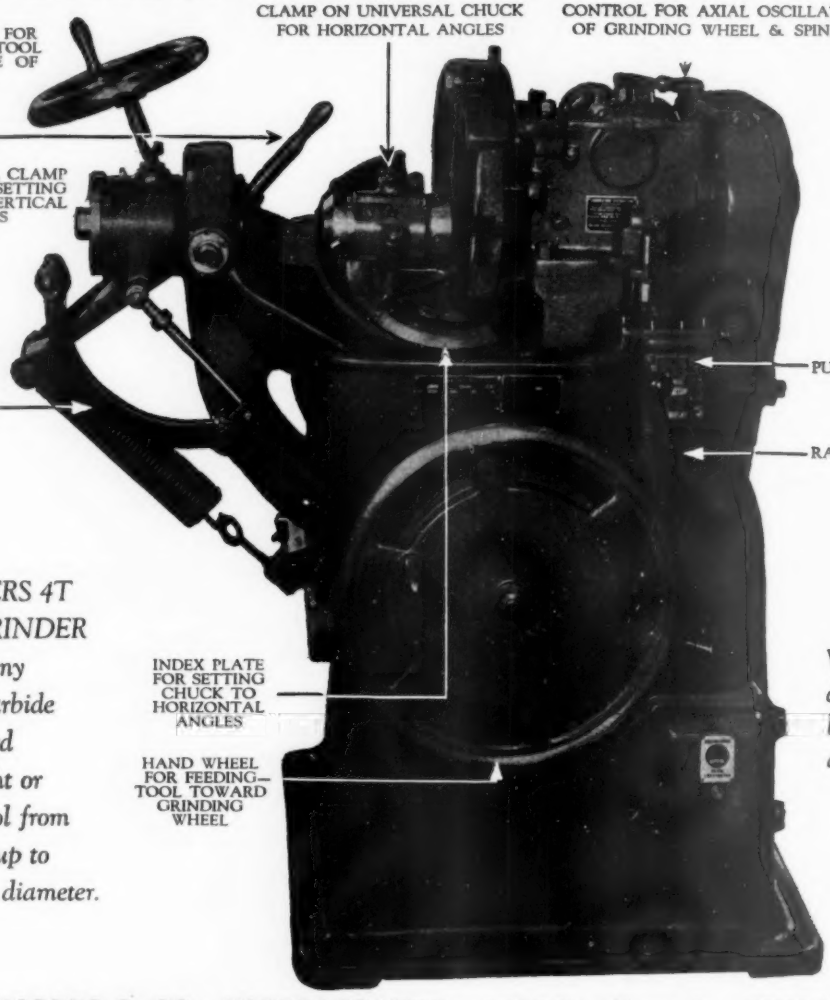
Ask your Carpenter representative for a copy of the ***Matched Tool Steel Manual.*** In it you will find 159 pages giving definite ways to simplify the selection and heat treatment of tool steels. The Carpenter ***Manual*** now contains a special ***Tool Index and Steel Selector*** . . . showing which steel best meets the requirements of each tool room job. Ask your Carpenter representative for this aid to better tool performance.

THE CARPENTER STEEL COMPANY • READING, PA.

Carpenter
MATCHED TOOL STEELS

KEEP PRODUCTION AT PEAK!—GRIND TOOLS ON SELLERS TOOL GRINDERS

SELLERS No. 4T TOOL GRINDER


HAND WHEEL FOR TRAVERSING TOOL ACROSS FACE OF WHEEL
CLAMP ON UNIVERSAL CHUCK FOR HORIZONTAL ANGLES
CONTROL FOR AXIAL OSCILLATION OF GRINDING WHEEL & SPINDLE
INDEX PLATE, CLAMP & LEVER FOR SETTING CHUCK TO VERTICAL ANGLES
LEVER WHICH OSCILLATES CHUCK IN VERTICAL PLANE
PUSH BUTTON CONTROL
RATCHET HAND WHEEL CONTROL
INDEX PLATE FOR SETTING CHUCK TO HORIZONTAL ANGLES
HAND WHEEL FOR FEEDING—TOOL TOWARD GRINDING WHEEL

The SELLERS 4T TOOL GRINDER will grind any cemented carbide or high speed steel, straight or curvexed tool from 1/4" square up to 1 1/2" x 2" in diameter.

Write for descriptive bulletin and prices.

WILLIAM SELLERS & CO., INCORPORATED • 1626 Hamilton St., PHILADELPHIA, PA.

Are You Getting the Most Out of Every Grinding Job?

NORTON Offers Help with *These Practical Booklets*

INFORMATION on many kinds of grinding—gathered by Norton engineers in the field and in the laboratory—has been made available to industry in a series of Norton booklets, seven of which are described briefly here. They will prove especially helpful to plants doing defense work, many of which must turn out new products with new help.

1 **Tool Room Grinding**—177 pages of practical information on grinding practice in the modern tool room.

2 **For Portable Grinders**—covers the many and varied uses of portable grinders in the foundry, the steel mill, fabricating shop, die shop and the stone industry.

3 **Grinding "Haynes Stellite"** — the correct grinding wheels to use and the proper grinding procedure for tools of Haynes Stellite "J-Metal" and "2400".

4 **Thread Grinding**—a handbook which discusses some of the common difficulties encountered in thread grinding and how they may be overcome.

5 **Abrasives and Grinding Wheels**—Especially interesting to vocational students and apprentices — describes briefly and clearly the elements of a grinding wheel and the fundamental principles of grinding wheel selection.

6 **Cut-off Wheels**—the proper use of these wheels for cutting metals and non-metals by the dry, wet and submerged methods is discussed in detail.

7 **Grinding Carbide Tipped Tools**—full information on the correct selection and use of metal bonded diamond wheels, resinoid bonded diamond wheels and Crystolon vitrified wheels for grinding all types of cemented carbide tools.

GRITS AND GRINDS

—a monthly publication on abrasives, grinding wheels and grinding machines. Its articles are written by experienced Norton engineers and research workers and cover all phases and all kinds of grinding. Your name will be put on the mailing list without charge or obligation.

This informative literature is just another part of NORTON SERVICE—a service that embraces a complete distribution system, consulting engineering and extensive research. Now more than ever NORTON SERVICE is important to you.

NORTON ABRASIVES

NORTON COMPANY
Worcester, Mass.

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Is "Waiting For Big Machines" Stifling Your Production?

STANLEY CONTOUR GRINDER – high speed grinder for finishing dies, gauges, templets, finding blanks; correcting hardening distortions. Scores of other light grinding jobs! Tilts to 45°.

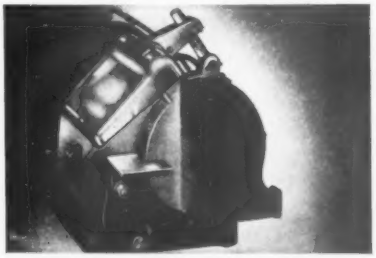
STANLEY TOOL ROOM GRINDER – can be used freehand or in milling machine, shaper, lathe. Handles external or internal grinding on dies, machine parts, cutters, etc. Drives wheel up to 1½" x ½".

Check those jobs which are held up by slow delivery of big machines. Get your Stanley Distributor in! Invite him to show you how and where Stanley Electric Tools can speed up your production. To demonstrate how accurately and fast these tools can handle many time-consuming jobs.

He will show you Stanley Unishears for cutting sheet materials. Stanley Grinders – Contour, Toolroom, Bench and heavy Portable types. Stanley Electric Hammers, Drills, Screw Drivers and Safety Saws. Every one of these tools will help you cut corners without costly delays. If you prefer, write for literature. Stanley Electric Tool Division, The Stanley Works, 143 Elm Street, New Britain, Connecticut.

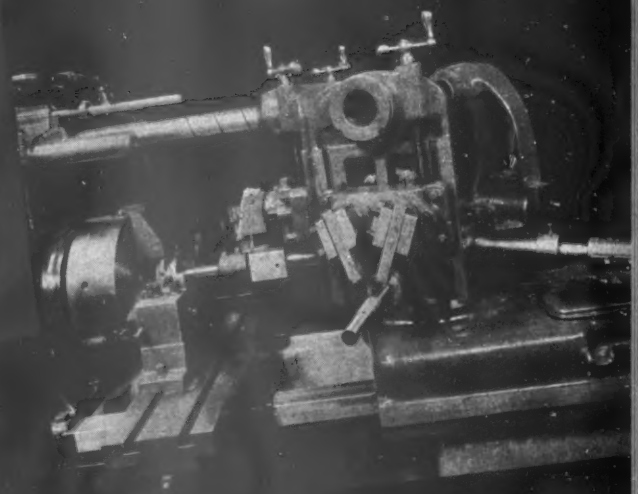
STANLEY
Electric Tools

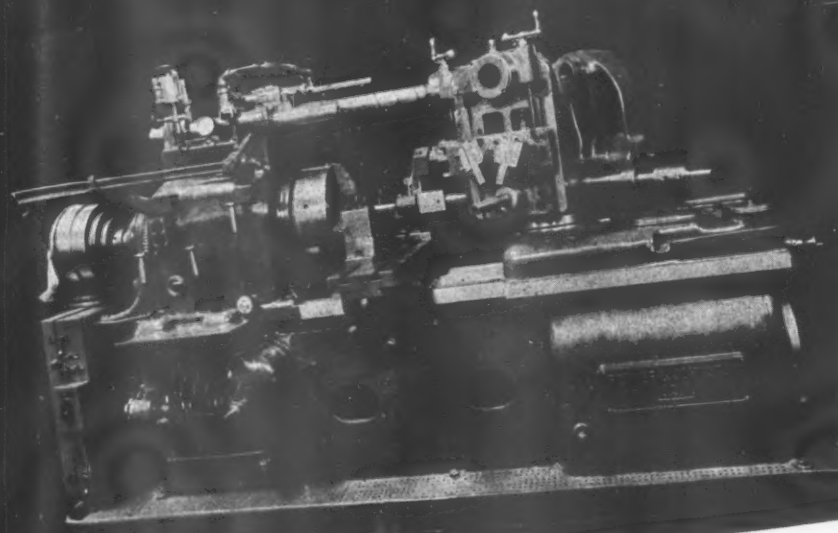
STANLEY FLEXIBLE SHAFT GRINDER – has 42" shaft; handle with collet type ¼" chuck. Used for fast grinding – internal or external – on tools, dies, castings. Direct drive ⅜ H. P. motor, 18,000 R. P. M.



STANLEY "FLUD-LITE" EYE SHIELD – has two 4" x 6" safety glass windows; two frosted, shadowless bulbs. Adjustable guards. Gives 30% more visibility.

P&J 5-D POWERFLEX





PRODUCTION DATA

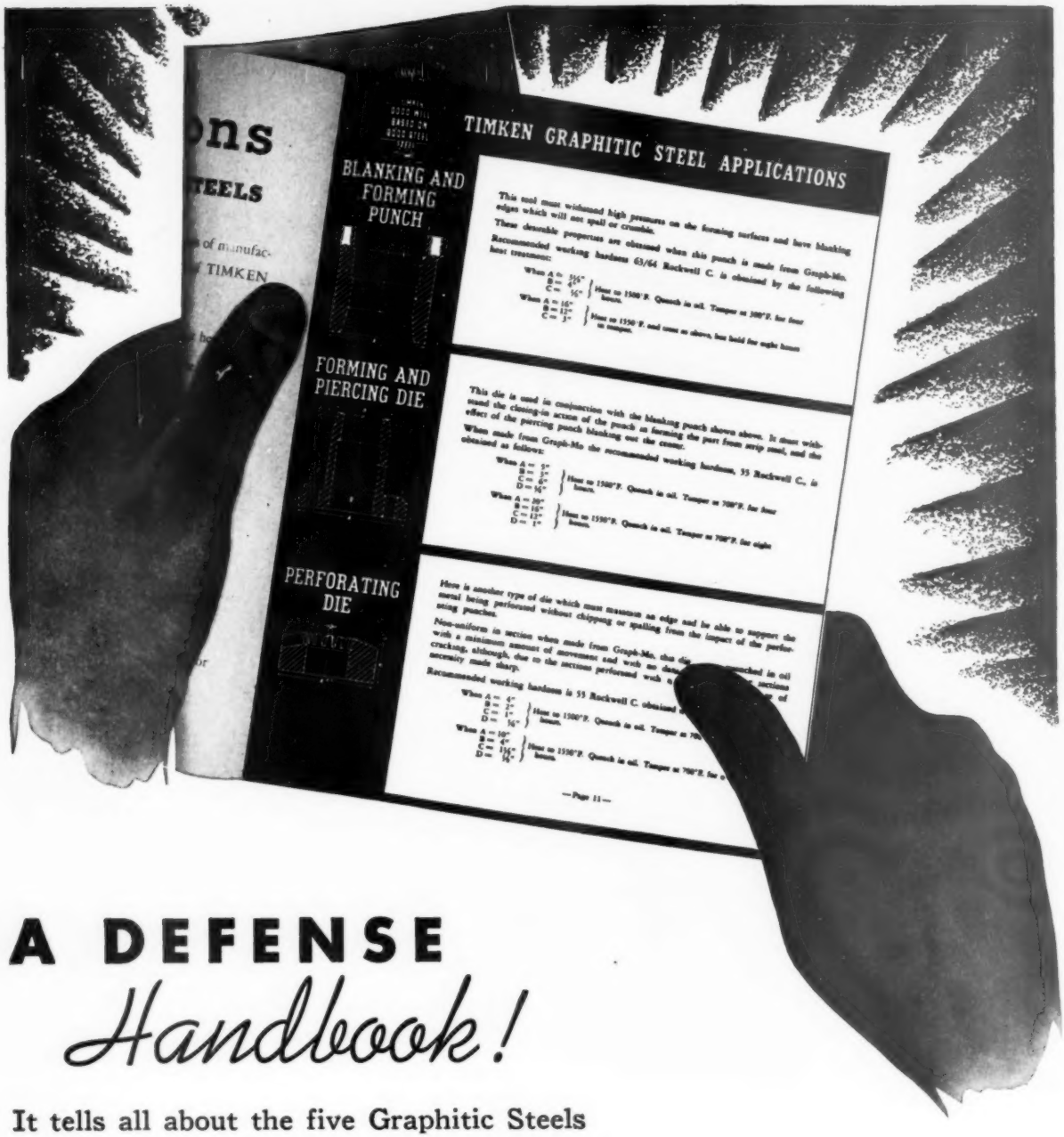
Part: Bearing Cage.
Material: Malleable Iron
Machine: 5D Single Spindle Powerflex
Operations:
1st T.F.: Rough bore hole; rough face flange; rough turn and face 4.871" dia.
2nd T.F.: Finish above cuts; chamfer where necessary.
3rd T.F.: Ream hole 4.332" dia.
4th T.F.: Size turn 4.871" dia.
Machining Time: One operation only — 2.54 min.
Floor to Floor Time: 2.84 min.
Production: 18 pieces per 51 min. hour
One operator can easily handle four machines on this class of work.

A recent order was placed for several P&J 5-D POWERFLEX Automatic Chucking Machines for handling a considerable range of larger sizes of bearing cages. Each lot to be produced involved cages of different dimensions—a requirement which called for quickly adjustable type of tooling.

How this requirement was met is shown clearly in the accompanying photographs.

A cross slide is provided which operates simultaneously with the action of the turret tools and makes provision for mounting of rough and finish facing tools to the front and rear of the part. Whenever tooling requirements make operation of an auxiliary slide tool mounted on turret desirable, the cross slide acts also as an operating mechanism. Three automatic changes of feed are provided and available for action of the cross slide and turret slide. Power operation of speed and feed clutches make it practical to shift under load.

The 5-D POWERFLEX—one of the latest models in the P&J complete line of automatic chucking machines—is equipped with Timken bearings on spindle and headstock shafts. Headstock providing four automatic changes of speed is a self-operating unit. Turret slide and machine bed are equipped with hardened and ground steel ways. Turret is indexed by Geneva movement and automatically clamped after indexing.



A DEFENSE *Handbook!*

It tells all about the five Graphitic Steels that machine 25% faster than comparable steels.

It answers your questions, gives methods of heat treating, tabulates physical properties, shows you photomicrographs and presents 31 specific applications. It's yours for the asking. Write for it today.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO
Steel and Tube Division

TIMKEN
ALLOY STEELS

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.

a new Super-Fast Electric Drill

To match the pace of faster schedules

Thor U14FS 1/4" DRILL

NOW- EVERYTHING YOU WANT

IN A DRILL FOR HIGH SPEED, HEAVY DUTY PRODUCTION

Powered for top speed drilling . . . **designed** for quick, easy handling . . . and **built** to stand up under constant, heavy duty operation—that's the new Thor U14FS 1/4" portable electric drill! It develops approximately **twice the power** of similarly rated, production duty electric drills, yet weighs only 4 1/4 pounds, measures only 7 1/4 inches overall. The new Thor U14FS is tough and ruggedly built . . . with, for example, the field case, handle, and bridge cast in one solid, strongly reinforced piece. The side handle permits rapid, accurate movements in restricted space and the correct application of pressure. The momentary trigger switch can be locked for continuous operation. Two rubber bumpers protect finished surfaces.

The new Thor U14FS drill is available in three speeds — 2500 RPM for general heavy production; 3750 and 5000 RPM for faster drilling on lighter materials, particularly on aircraft.

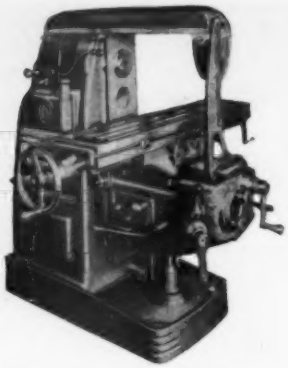
For full information, write for Thor Bulletin No. E-319.

Thor *Portable Power Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO, ILL.

Branches in Principal Cities



The Sheffield Corporation Mills Gage-Parts Faster and Easier on

VAN NORMAN

No. 2-L HORIZONTALS

To delicate work like the precision gages made by The Sheffield Corporation of Dayton, Van Norman's No. 2-L Knee-Type Horizontal Miller brings new accuracy, speed, and ease of control. For No. 2-L combines unusual compactness with exceptional rigidity and dependability . . . rugged strength with extreme sensitivity . . . and highest accuracy with greatest ease of control.

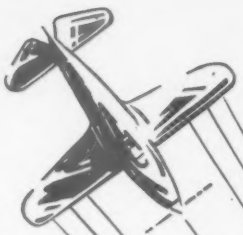
Operating convenience is provided by front and rear directional controls of power feeds and 6-way rapid traverse, which are always right at the operator's finger-tips. 18 speed changes are available through the exclusive Van Norman single-lever speed selector. And spindle-clutch lever is within easy reach on left of column. Accuracy is safeguarded by massive, rigid construction . . . especially the large and heavy table, knee and saddle assemblies . . . by extra-heavy spindle transmission . . . and dials that are large enough to be plainly and easily read. The Van Norman No. 2-L is made both in plain and universal models, and has a work-holding surface 45" x 10". Write for facts.

VAN NORMAN MACHINE TOOL COMPANY
SPRINGFIELD, MASSACHUSETTS

VAN NORMAN Milling Machines

■ GEARS ■ CARTRIDGE DIES ■ SHELL CHAMBERS ■

■ CONNECTING RODS ■ PROPELLER HUBS ■ SYNCHRONIZER PARTS



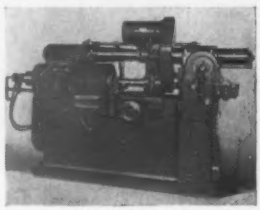
FIRE POWER

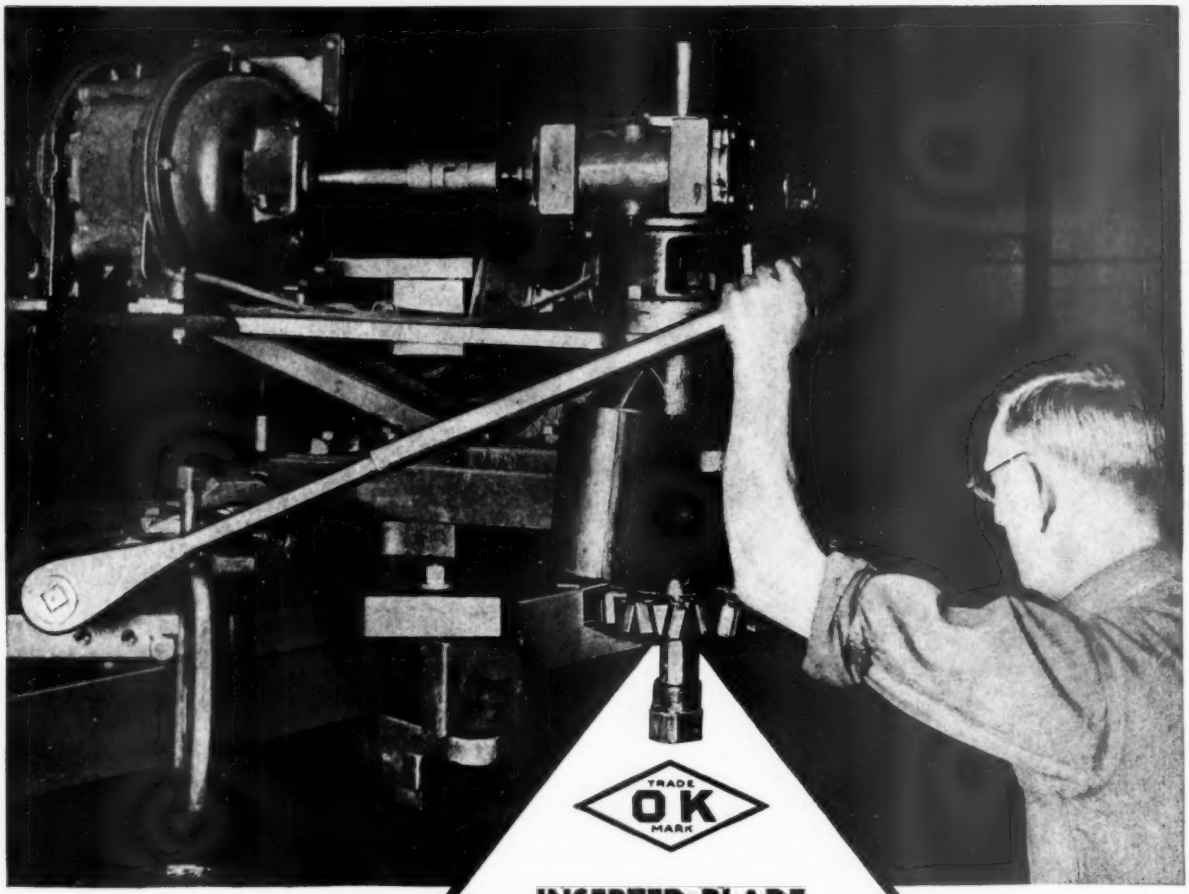
Bryant Hydraulic Internal Grinders are part of the "ground crew" that makes the tremendous fire power of modern military planes possible. Leading aircraft, aircraft engine, and aircraft armament manufacturers appreciate the precision, fine finish, and fast production offered by the Bryant method. That's why, whenever you see an airplane, you see parts that were ground on a Bryant. A post card will bring you the new Bryant Aircraft Catalog. Send for your copy today.

BRYANT CHUCKING GRINDER CO.

SPRINGFIELD, VERMONT, U. S. A.

No. 16-C-16 Bryant Internal Grinder





INSERTED BLADE MILLING CUTTER

TAKING A DEEP CUT IN HEAVY SHIP PLATES

In a large shipyard engaged in building destroyers, cruisers, etc., a special portable machine is used for milling a tapered shoulder around the corners of heavy ship gratings. The machine is bolted directly onto the work and an O K Milling Cutter, with its inserted blades shaped to the proper angle, is used for taking this deep, heavy cut. The O K System of inserted blade metal-cutting tools is responsible for better performance and greater economies in all types of armament production . . . Better performance because O K Tools are ruggedly built to take on the toughest, most exacting jobs . . . greater economies because only the bits of these tools are made of expensive high speed steel. Take a tip from the manufacturers of aircraft—the builders of warships! Equip your machines with O K Tools and watch efficiency rise.

THE O. K. TOOL CO., Shelton, Conn.

SYSTEM
OF INSERTED-BLADE METAL CUTTING TOOLS

MILLING CUTTERS
END MILLS
FACE MILLS
BORING HEADS
REAMERS
COUNTERBORES
LATHE TOOLS
AND BITS FOR
EVERY METAL-
CUTTING JOB

ALLOYS

Timely information about metals... CATALOGUED for your convenience

Specific answers to many of your questions about the selection, fabrication and uses of Nickel alloys are available to you quickly from our files.

This fund of helpful information we have gathered, checked and condensed into convenient printed form. The graphs, charts and shop guides are especially useful to men handling new materials or performing unfamiliar operations . . . and to new employees. This literature is available on request.

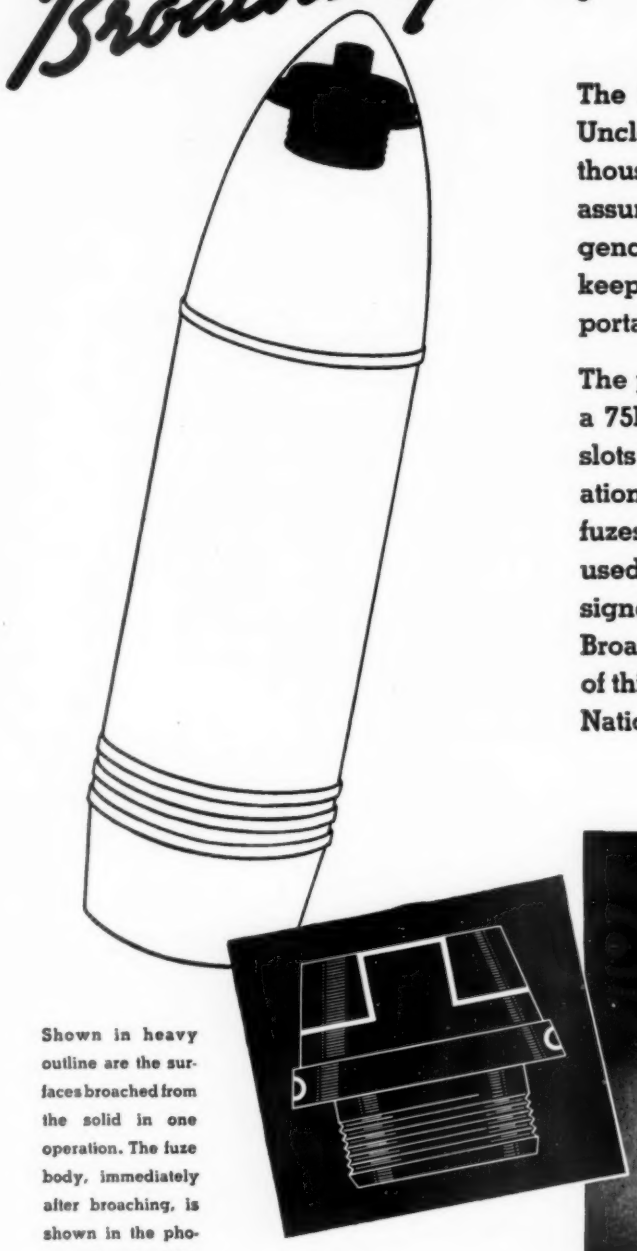
You are also offered the assistance of our technical staff in solving material problems arising from a temporary lack of Nickel. These engineers are offering timely suggestions to many vital industries during the present emergency.

Why not drop us a card asking for list of available literature. Your request for the assistance will receive prompt attention.

NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

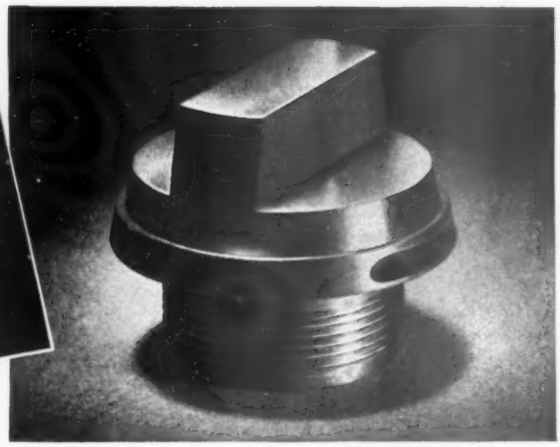
Broaching Keeps 'em Firing



Shown in heavy outline are the surfaces broached from the solid in one operation. The fuze body, immediately after broaching, is shown in the photograph at the right.

The 20 rounds per minute firing rate of Uncle Sam's newest field guns means that thousands of shells per day are required to assure an adequate supply in case of emergency. Detroit Broach is doing its share in keeping a steady stream of this vitally important material flowing to our new army.

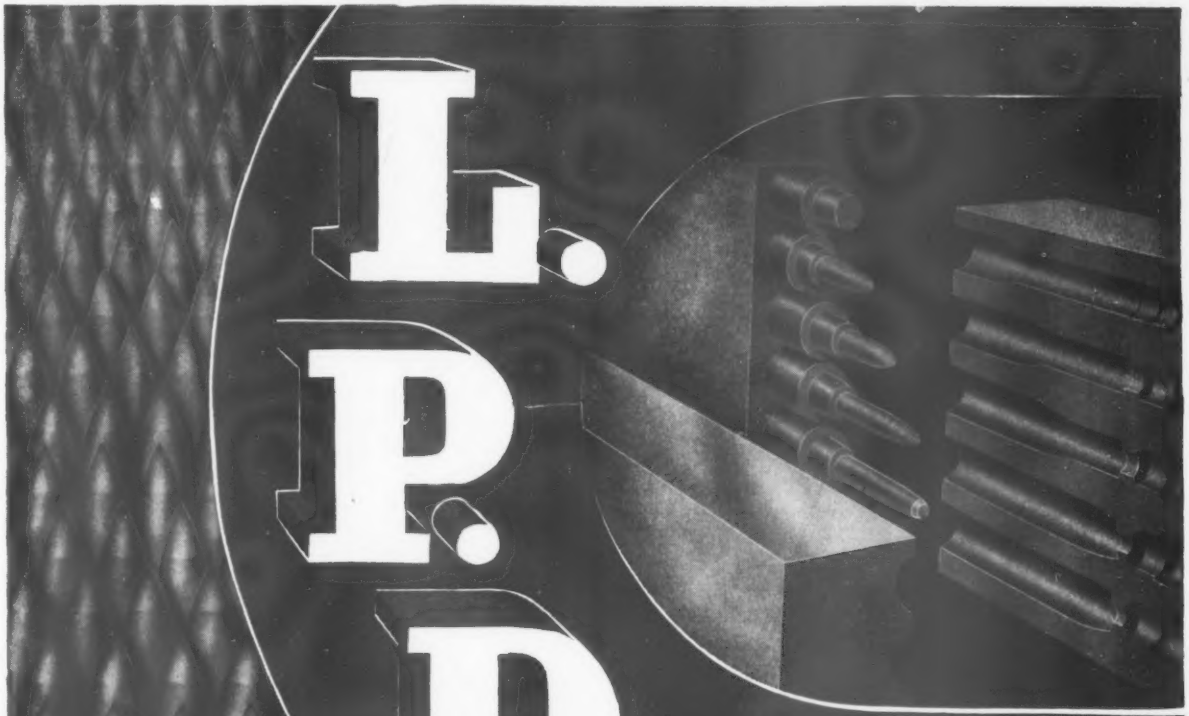
The part shown below is the fuze body for a 75MM shell. The upper surface and the slots in the sides are broached in one operation and at a rate of more than a thousand fuzes per hour. The broaches and fixtures used to perform this operation were designed and manufactured by the Detroit Broach Company. This is only one example of this company's many efforts to speed our National Defense Program.



DETROIT BROACH COMPANY

20201 SHERWOOD AVENUE • DETROIT, MICHIGAN

LATROBE



L. P. D.

A HOT WORK DIE STEEL

The tempo of today's defense preparations is greatly accelerated by the modern methods employed in shell manufacture. LATROBE is doing its part by making available L. P. D., an ideal hot-work steel for shell punches and dies. L. P. D. offers excellent resistance to wear at high temperatures, and affords maximum precision in the many operations requiring hot forming dies. *Write for your copy of our special bulletin on L. P. D.*

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ELECTRIC STEEL COMPANY

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Machines you should know about

BROACHING PAYS IN JOB LOTS

Number 4

The

"JUNIOR"

ON THE JUNIOR—a low cost bench press all-hydraulic in operation—you can perform all kinds of miscellaneous operations—broaching, assembly, light straightening, etc.—in job lots or continuously.

It is the sort of machine that is spelling the difference between a headache and a profit on numerous fussy little jobs.

For the money involved you can't go wrong—and you don't have to wait 18 months to get one (or a dozen) either.

We will be glad to send you a specifications sheet and prices. *Just drop us a line.*

The

"SENIOR"

WHERE YOU WANT to cut production costs—or if you just don't want to wait 12 to 18 months for milling machines—this Senior Press by Colonial will do many a "milling," "boring," or "reaming" job faster, cheaper and more accurately—by broaching.

It is the kind of machine that—when the present furore is over—you will be glad to have in your shop; to make profits when the going is tougher.

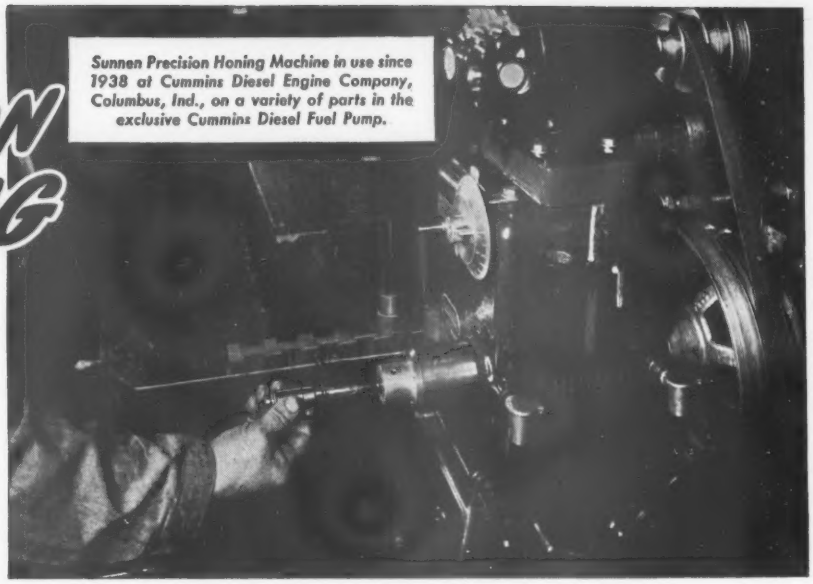
We'll be glad to tell you how many of your present or proposed jobs can be handled on this machine. Send us blueprints or ask us to have a field engineer stop in.

If you just want specifications, now, ask for Bulletin No. VBS-40.

COLONIAL BROACH COMPANY

147 Jos. Campau Street **Detroit, U. S. A.**

SUNNEN PRECISION HONING



Sunnen Precision Honing Machine in use since 1938 at Cummins Diesel Engine Company, Columbus, Ind., on a variety of parts in the exclusive Cummins Diesel Fuel Pump.

Contributes to the Fuel Pump Accuracy of Cummins Diesel Engines

● The picture above shows the Sunnen Precision Honing Machine finishing fuel pump barrel for the metering plunger. The plunger diameter is held to a tolerance of .0002".

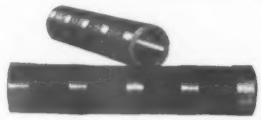
Here's another example of how Sunnen Honing is serving manufacturers—especially those holding important defense contracts.

Typical Uses

Drawing and Blanking Die "Saves time in producing smooth base metal finish."

Inner Bearing Ring "Accurately removes last 'tenth' of stock."

Diesel Engine Fuel Injector Cylinder, "So accurate that a piston can be fit within .00005 inch."



"A perfectly straight round hole with a mirror finish."

Bronze Valve. The Sunnen method of honing is used to secure a high finish and accuracy.

Aviation Hydraulic Cylinder made of Aluminum-Alloy. Improving the quality of the bearing surface they contact. An extremely smooth surface-finish was secured.

"Produced an extremely accurate and glass-like finish."

Solves Five Important Problems

1. Corrects errors of out-of-round and taper produced by previous operation.

2. Produces super-smooth surface finishes.

3. Accurately finishes holes to very close tolerance as to size and straightness.

4. Maintains alignment already established by previous operations.

5. Provides a simple, low cost production method for accurately duplicating sizes.

Wide Range of Uses — The Sunnen Model "MA" Four Speed Precision Honing Machine will handle any size hole from .185" to 2.400" in diameter in any metal except lead or babbitt.

Saves Time because it can be set up for any size job and ready to go in less than a minute—no locating.

Saves Money — Low in initial cost (basic price only $195); economical to operate; requires only semi-skilled labor.

Saves Man Hours — Saves training time—any intelligent young man can learn to do precision work in 24 hours.

Saves Power — Uses only 1/3 hp—relieves big grinders and other machine tools for other work.

Accurate — Accuracy within .0001" guaranteed.

Let Us Help You Solve Your Problem.

In the column on the left we show a few typical jobs handled on the "MA."

Write for the new 8-page bulletin giving complete information — or if you prefer, a Sunnen Sales Engineer will call and demonstrate the Sunnen Precision Honing Machine in *your* plant on *your* job. Write today.

SUNNEN

SUNNEN PRODUCTS COMPANY
7932 Manchester Avenue, St. Louis, Missouri
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FINGER-TIP CONTROL means faster production

Press-fit assembly, straightening, and any similar work involving the application of pressure can be done at greatly increased production rates, and with far easier handling due to the simplicity of the Hannifin sensitive pressure control, illustrated on this 75-ton forcing and straightening press. The exclusive sensitive pressure control provides infinitely variable ram pressures, from a few pounds to full capacity, at a touch of the control lever. Moving the lever down increases the ram pressure; releasing it returns the ram to top position. This simple and sensitive control is so natural, so easy to handle that rapid production and improved accuracy are assured.

Hannifin Hydraulic Presses, with welded steel frames, built-in hydraulic power, and improved control, permit flexibility in design to meet individual needs. In standard size presses, table construction, gap, reach, and ram stroke are readily modified. Ram stroke is adjustable to avoid unnecessary up-travel of the ram.

Hannifin engineers will submit detailed recommendations upon receipt of your specifications.

HANNIFIN MANUFACTURING COMPANY

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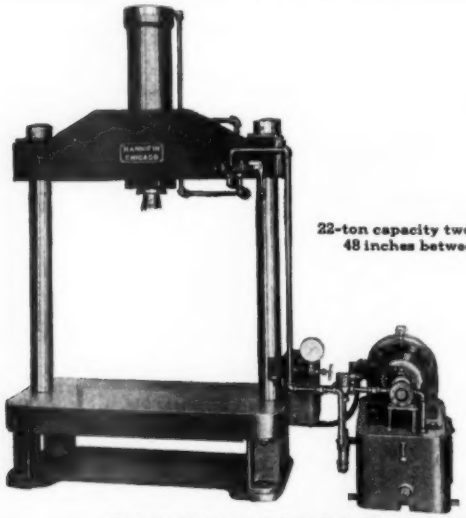
While National Defense needs are taking most of our greatly enlarged plant capacity, we will continue every possible assistance to users of Hannifin production tool equipment. Standard types of Hannifin hydraulic and pneumatic equipment may be modified to meet individual needs, avoiding delays due to special design. Hannifin engineers will give you specific recommendations.

* * * *

75-ton forcing and straightening press. 28-inch stroke. Both hand lever and foot pedal sensitive pressure control.



22-ton capacity two column press, 48 inches between columns.

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HANNIFIN Hydraulic Presses

THE TOOL ENGINEER

T.M. Reg. U.S. Pat. Office

Volume X, Number 11

Where Industry and Labor Cooperate

THE chasm between the cooperative comments made by national labor leaders and the myopic strikes which continue to delay Defense Production could be amusing in less dangerous times. The humor is lost on a nation which sees the wave of strikes continuing despite all the efforts of federal and local arbiters.

We believe that labor leaders are generally sincere in their desire to avoid delay in any defense project by strikes. It is also possible to see the viewpoint of the striker who, surrounded by rising costs, feels that he is entitled to a share in the increased business coming to his employer.

Strikes have always been associated with a rising business curve. In these unusual times, however, many a business finds costs and taxes eating the profits away faster than the increased volume builds them up; is consequently reluctant to meet union demands.

The efforts of the government have been partially effective in the reduction of strikes affecting Defense Production. This is not enough. There should be no excuse for any strike which will delay our war effort. At the same time employers should not be permitted to take advantage of opposition to strikes to deny the workers legitimate increases.

A solution has been found in Canada for this apparent dilemma. All basic wages have been pegged and cannot be increased without permission from the Government. The point of pegging is the 1926-29 average and all industries below this rate are required to raise wages slowly until they reach it. In addition to the basic wages a monthly cost-of-living bonus is paid, based upon twenty five cents a week for each one per cent increase in the cost of living. To reduce what would become an excessive amount of paperwork the bonus is changed only when there has been a five per cent change. The Canadian bureau of statistics finds in its latest report an average increase in the cost of living in the past year of 13.8 per cent which would justify a bonus of $3.45 a week.

Tool Engineers who, while they were attending their recent meeting in Toronto visited plants doing war work, noticed evidences of this bonus. Posters throughout the plants explain the plan to workers. This campaign has so successfully enlisted their cooperation that days lost in labor disputes are only about one seventh the per wage earner rate in the United States.

Perhaps this is the solution we need. Certainly a policy as successful as this is deserving of thoughtful consideration. To continue our defense effort with the present chasm of misunderstanding between national labor leaders on one hand and local unions and their heads on the other, is like building all our armoured tanks with a wide crack down one side.

Tapping Trouble?

CHECK THESE POINTS

If your taps are breaking, or not cutting smooth, proper size threads, it may not be the taps' fault. Here are a few things to check to help you locate and correct tap trouble

TYPE OF HOLES TO BE TAPPED

If a blind hole, is there sufficient untapped space at the bottom for the accumulation of chips?
Is a "Gun" tap that shoots the chips ahead being used? (In a blind hole tapped very nearly to the bottom and having no recess, the "Gun" tap is not recommended.)
Do conditions call for a two or three fluted tap?

CLASS OF FIT REQUIRED

If the tap produces an oversize hole, has the proper tap been selected for the class of fit desired?
If proper tap is being used, is there any play in the work or tap holding spindles (provided rigid spindles are being used)?
Do the work and tap line up accurately?
Is the tap dull?

TYPE OF MACHINE

Is drive uneven because of slipping belts?
Is machine powered properly?
Are tap and drilled hole in alignment?
Is there undue wear on sliding parts?

TAPPING SPEEDS

Is the speed too slow?
Is the speed too fast?

TAPPING DIFFERENT MATERIALS

Has the tap proper cutting face for the particular material being tapped?
Is the tap of the proper design or type?

This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known

PROPER HOLE SIZES BEFORE TAPPING

Is the drilled hole of the proper size?
Is the drilled hole perfectly round?
Is the axis of the hole parallel to the axis of the tap?

LUBRICATION

Has the proper lubricant been employed?
Does the lubricant flood the tap sufficiently while engaged in the hole?
Is there sufficient force behind the lubricant to wash away the chips?
If applied with a brush has the lubricant a sufficiently heavy body to adhere to the tap? (A light lubricant will be thrown off the revolving tap before it enters the hole.)

TAP HOLDING DEVICE

Is worn or wrong type of holder being used?
Is holder in alignment with drilled hole?

CHAMFER

Is the point diameter of tap correct for the size of hole being tapped? Does the tap enter the hole an excessive number of threads before taking hold, thereby losing the full benefit of the entire chamfered portion?
Is the chamfer the correct length?
Is the chamfer chipped or dull and in need of regrinding?
Is the chamfer relief too great or not sufficient?

"Maxi" Tap, for abrasive metals
"Gun" Tap for through holes in stringy metals
Standard Tap for average production operations

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GREENFIELD, MASSACHUSETTS
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War Production with Old Machines

By adapting old machine tools for precision production rather than marking time while waiting for new machines, democracy can speed the job of producing the materials of war.

By ARNOLD THOMPSON

President, Tool Engineering Service, Reg'd. Toronto

THOMAS ARNOLD, Machine Tool Controller of Canada, speaking before the convention of the Canadian Manufacturers' Association, stated, "Manufacturers should use their heads, take standard machines and use jigs and fixtures to turn out their materials. There are certain classes of tools we simply can't get. Any idle tools, new or old, that could do their work will be taken. We can't wait. Don't wait for new tools. Patch up the old ones and do your best."

H. J. Carmichael, Joint Director-General of Munitions Production, supported Mr. Arnold's plea for increased use of rebuilt tools. His department no longer merely requested but demanded that "prime contractors, study all the resources at their disposal and use them to fully speed up work on war contracts".

Pride of Possession

Let me here premise that, we all love good machines, and pride of possession, and using good machinery is the same with us as it is with automobiles, homes, and fishing tackle. None of us take pride in using the junk pile; that is usually done of necessity. Now, a necessity has arisen and we Tool Engineers should adapt ourselves to the necessity.

An old machine is either useful or scrap. The older the machine in respect to years of life, the *simpler* it usually is. The older in respect to wear and abuse, whether simple, or "Modern", the less useful it can be.

Arnold Thompson
The essential is simplicity.

In the beginning of things, Man had rationality to use the things of nature. He could combine them, split them up and fabricate them, but has not been able to create any material. So, the Tool Engineer can only use material that is available to fabricate machines and tools. Time, Man, and material of nature must be coordinated.

I am of the opinion that the adapting of used machines comes within the scope of the Tool Engineers activities. at least it is a subject that should be considered pro and con.

The Tool Engineer is responsible for efficient production and to this end usually insists that only the best machines are good enough to get the desired results from the tooling he proposes.

The machine tool manufacturers co-operate most willingly, and why not? It is good salesmanship.

Complicated Design

To meet the Tool Engineer's requirements they added multi-heads, multi-speeds, multi-feeds, quick change devices, cams, air and hydraulic operating, precision bearings, electrical control, push buttons, and other devices until a $1,000 machine costs $3,000. The extra cost may be justified by the efficiency of the product and cost of producing the article for mass production, but very often this $3,000 machine is used for operations that could be performed just as efficiently on the $1,000 machine.

It is conceded that the Tool Engi-

neer must have considerable knowledge of machine design, but the machine tool builder is inclined to use the tool designer's art as a means for building up sales of his own product.

To illustrate, a turret lathe manufacturer, if asked to do so, will probably design tools to do any type of machining on a specified part, on his machine, when in his own mind he knows that much simpler machines with simpler tools, and dividing up the operations on other makes of machines, would be more efficient and less costly.

This high efficiency is also in advance of the skilled help available, and has not yet been able to absorb the ever increasing unemployed, unskilled help.

I think the adapting of used machines will help to employ and improve the unskilled help into something better than mere "button pushers". They must, however, be simple machines. Any attempt to use complicated machines that have been discarded usually ends in loss of time and material.

Less Beauty Finishing

It is timely that we re-consider this question with a view to the conservation of time and material, in order to better meet the emergency of national defense. As an example, England has stopped all paint and beauty finishing on her machines for the duration of the war, and in this way alone has released considerable of her manpower for more important uses. We can also discard a lot of the accessories of modern machines without reducing their efficiency for war-time production.

In order to better understand the relationship of machine tools to production, study their history and development.

History during our school days did not seem to be of any use for mechanical work. You find however, that the history of machines and tools will be of great assistance to you in understanding the design, construction, and use of present day machines and tools.

So, let us consider the history and development of automatic screw machines, turret lathes, and engine lathes, from foot lathes. The early method of turning is familiar to all and was mostly used for turning of wood wheels and axles for carts; operated by hand or foot power, using hand tools. The first example of a lathe looked like a grindstone of the farm, where the stone became the cartwheel and instead of sharpening a tool, a tool turned the work.

Later, the application of power by means of belt or rope drive and by using step cone pulleys to obtain various speeds, developed the wood turning lathe as in general use today.

When the technique of turning had reached this stage, mechanics, in other lines of endeavor had developed screws, gears, and mechanical movements for watch-making, pumping, windmills, steam engines, etc. Some of these mechanical movements were applied to the lathe to give screw cutting, longitudinal and cross traverse, the simple lathe of present times.

The addition of motor drives, quick change gears, various attachments, modifications, and additions to meet the requirements of various industries, only exemplifies the skill of the machine designers and builders.

In this form the lathe is not an efficient production machine. Improvements, using multiple tool holders developed the turret lathes. These and multi-cut lathes required special tooling for each job and this created the need for tool designers and a better type of tool making.

Fundamentals Unaltered

A shortage of skilled turret lathe operators and the desire for one man to attend a number of machines brought into use the cam operated turret lathe or automatic machine. Later, to conserve tools, 4, 6, and 8 spindle automatics were developed.

From time to time additions are made, as motor drive, push button control, change speeds, change feeds, forced lubrication, coolant circulation, chip conveyors, filters, and clarifiers. Whilst making the machine appear complicated these additions have in no way altered the fundamental principles.

In the final analysis what have we? A work holder, tools, and tool holders, and means of applying the necessary power for speed and feeds. (This also applies in a general way to all production machines).

Now, if the Tool Engineer designs the work holders, tools, and tool holders, in an efficient manner, without too much thought of the type of machine he is going to use, and having decided the most efficient method for any one operation, or sequence of operations, he can then take stock of the old and the new, good and bad, simple and complicated machines that are available, and having selected a machine he should then specify the exact requirements necessary to perform the operation. If an old machine is chosen have it stripped and rebuilt for that and similar tooling.

Free From Strains

Do not consider the term "old machines" as necessarily implying worn and inefficient. An old machine is usually well seasoned and free from strains. When selecting an old machine the essentials are simplicity, rigidity, and adaptability. Good bearings, good alignment, and suitable speeds and feeds for the class of material to be cut and the tools to be used.

There have been many examples in my experiences and I would like to recall a few:

(1) Broaching on a Wire Drawing bench using short sections of broaches, hooking them on a chain, pulling them through a rough drop stamping of the body of a rifle. This was forty-five years ago.

(2) Using a Power Press to push fourteen spline broaches each about ten inches long, one after the other, through a worm 3½ inches long.

(3) Six inch shells, during the last war, bored and turned on home-made lathes, using girders, concrete and shafting and Babbitt.

(4) Old turret lathes, cross slides removed, fitted with a large bushed steady lined up with the spindle to act as guide for combination tools held in floating holders in the turret. In other words, making a jig of the headstock bed and bushed steady to guide tools, the inherent misalignment and wobble of the turret not affecting the accuracy of the product.

(5) Worms cut with generating cutters on an engine lathe, using a hormonic train of gears and a short master lead screw.

(6) Parts of old automatic screw machines used to build special-purpose automatic machines.

(7) Quick traverse reverse feed mechanism put on standard machines.

(8) Simple lathes used for "comb" chasing threads.

(9) Simple lathes used with Carboloy tools for precision sizing, often saving grinding machines.

(10) Old lathe beds used with drilling and boring units.

These and many such contraptions that served the purpose years ago can be made to serve in this emergency.

The tendency in Canada is to say "The Government is paying for the machines so let us get the best available". I recall a case of drilling small holes. The Tool Engineer proposed a full automatic, dial magazine feed, multi-spindle machines such as they used for their mass production drilling, to cost $12,000. The $12,000 machine could be used only a few hours a day for the production required whereas a $400 machine and fixture would do all the production required.

After the War

Another reason given for getting the most modern machine is that "we can use it after the war". My experience during the last war is that machines used under war conditions had very little value after the war.

Too many machines of the same type are not easily absorbed for peace-time projects, and in order to use them it will be necessary to consider them as old machines and use some such technique as is now under consideration.

Home designed machines have a place in production for national defense. Most modern machines have been developed from the home designed machine and put on the market when their efficiency had been proven in the designer's own shop on their own product. The cost however, should be commensurate with the production requirements, and be amortized over the contract as such home designed machines are of little value after the war is over.

The use of old machines "as is", "re-conditioned", or "rebuilt" under the present "used market" conditions, will not serve our purpose. Each used machine should be bought for a specific job with the realization that it must be *adapted* for the tooling that has been designed or anticipated and the quantity of production required.

The "used machine" market is a very sore spot.

I would suggest that the machine tool manufacturers co-operate to keep all used machines off the market, buy them back, re-build them, and re-sell them under guarantee; or if too badly worn or obsolete, strip them down for scrap or salvage under the advice of their own engineers and management.

These remarks on the utilization of old machines apply particularly to drills, boring machines, turret lathes, multi-cut lathes, and automatic lathes.

Milling, grinding, precision boring and such like machines are of such a nature that the machine itself determines most of the accuracy and efficiency of the work done, and the Tool Engineer can only add his skill to aid the machine. But, even with these machines, continuous re-conditioning is necessary, therefore the simpler the machine the easier to keep in condition.

Machine Tools Controller Arnold
"We can't wait."

There are, however, many operations, particularly boring, where all the precison can be in the fixture and tools, the only essential of the machine is to give power and motion.

There is a tendency for machine builders to revert to simpler and smaller machines with simpler operations such as motor-driven units, smaller and simpler, drilling machines, milling machines, slotters and shapers, profilers, and bench turret lathes. The manufacture of these will conserve skilled labour and will do much to absorb unskilled labour. They will also have useful life after the war.

We must not overlook the economies of using old machines and the Tool Engineer, if not acquainted with true costs, should consult with others better fitted to determine the economic value of this desire to use old machines.

As a war measure we can bridge the gap of time, but do not let any war-time success with old machines bias our judgment for peace-time mass production industry.

The Tool Engineer must develop a technique to suit any existing condition and in this respect consider "tooling up" as "an *aid* to the mechanic". Let the nature and volume of the production determine the limits of such aid.

Neither is it advisable to try this idea, of using old machines out on operations requiring very close tolerances and good finish, even if the Tool Engineer is assured they will do the job. Psychology enters largely into the question of using old machines and tools.

Workmen, foremen, toolmakers, and maintenance men, tend to use the old machine as an alibi for their own failure to produce good work.

Used Machine Blamed

It has repeatedly occurred in my experience that a used machine or contraption is blamed for bad work and high cost. A modern machine is put in to compete and very often the workman produces work equally as good off the old machine as he can off the new and the difference in the price paid for such operation, plus the proper accounting for overhead and amortization of machine and tool cost, often show that the expense of the new machine and tools was not justified. Again, I would not advocate using old machines for a new plant doing a major contract, but for sub-contractors on limited production in existing shops it will give satisfactory results.

In this emergency we must not let "the imagination of a vain heart" and a personal desire to approximate the ideal or to "show off" with complicated designs bias us for unnecessary expenditure of time and material. This war will not wait for us to obtain perfection.

Numerous "Davids with slings and stones" available now, while preparing for tanks, aeroplanes, and bombs for the future—may turn the tide in our favour. When tooling up let us consider the utilization of all man and woman power, time and material. Use what we can get, not what we would prefer. And, when man power engaged in national defense production reaches its peak, the Tool Engineer can then proceed to use his gifts for continued improvement and efficiency.

War Production with New Machines

Because of greater efficiency and faster production, every possible new machine tool that we can build must be put into operation for production of the materials of modern warfare.

By FRED DULL

Vice President, Monarch Machine Tool Co.
Sidney, Ohio

THIS is no time to argue the question of new machines versus old machines. We can do that after the war is over.

The problem today is one of new machines *and* old machines, working together, each supplementing the other, to do the production job that has to be done in order to win this war.

This is a crisis involving the freedom of the world and the destiny of nations. Certainly it is vital that we utilize every machine, of every kind old or new, obsolete or modern, which can contribute little or much to the job of protecting this freedom.

I think this premise was recognized from the very beginning; but it was a great deal easier to talk about than it was to put into execution.

People who knew little about machine tools assumed that you could take machine tools designed for peacetime production and shift them over to national defense production tomorrow morning. I don't have to tell any of you here today that it can't be done that way.

Mr. Thompson has just told you about some of the difficulties involved in adapting old machine tools for production of the type required in national defense work. And as all of you know, only a portion of old machine tools can be thus adapted.

I am told that one large corporation made a survey of some twenty-five to thirty thousand machines in use in their various plants to determine their adaptability for defense work. This survey showed that only about 40 percent were adaptable.

There are, in the main, two reasons for this:

First—many of the older machine tools are not capable of the accuracy required in national defense production.

Second—a great deal of national defense production has no counterpart in peace-time production. Therefore, there were not in existence any machine tools which could perform these particular jobs. New tools had to be especially designed for the purpose.

A Rush Order

So when the need for re-arming suddenly became apparent, our nation as a whole was in much the same situation as a plant that got a rush order for a new product for which only one-third of the plant's equipment was suitable, in a volume three or four times the plant's capacity for the old product.

The volume of production demanded by the defense program is far beyond the comprehension of any people except those who are actually engaged in it. For example, we are building in two years an airplane industry larger than the automobile industry became in thirty years.

In a single airplane engine, there are often over 8000 separate pieces of metal, and every one of them must be machined.

Way back in 1940, according to Burnham Finney in his excellent book on the defense program entitled "Arsenal of Democracy", we were talking about 150,000 airplane engines, 33,000,000 loaded shells, 300,000 machine guns, 400,000 automatic rifles, 1,300,000 regular rifles, 580 ships, and 50,000 trucks—just to mention a few of the supplies required. As you all know, the whole program has been stepped up substantially since that time. And most of these defense items demanded accuracy in production to an extent far beyond that required for most peace-time products.

The fact is that all the machine tools we had in this country two years ago simply could not even begin to get the job done.

The key to the success of our re-arming job lay in new, modern machine tools, many of them specially designed for particular defense jobs. And these machines were needed in quantities which by comparison with any past experience were absolutely incredible.

That was the challenge that faced the industry two years ago. What has been the industry's actual performance?

First, lets consider it in terms of dollars. Machine tool production averaged about $100,000,000 per

year. Last year the industry's output rose to $450,000,000, and this year will pass $750,000,000.

Second, lets consider performance in terms of numbers of machines. Normal production of new machines used to run about 2500 per year. In 1940 the industry turned out over 100,000 units, and 1941 production is expected to come close to 200,000 units.

But the whole story cannot be told either in terms of dollars or in terms of number of machines. It can only be told in terms of productivity.

Lets compare the productivity of our 1940 and 1941 machine tools with that of the machine tools in existence at the beginning of 1940.

It has been estimated that at the beginning of 1940 the total number of machine tools in all the plants in the country was about 930,000.

By the end of 1941 the industry will have produced in this year and last year, 300,000 new units.

Three Times as Productive

But as you all know, in speed, in power, in efficiency of cutting tools, in special design and in degree of automatic operation, machine tools have been improved to such an extent that the average new machine is over three times as productive as the average machine in use in January 1940. Most of the old machines, remember, were over ten years old at that time.

This means that the productive capacity of our new 1940 and 1941 machine tools will practically equal that of all of the machine tools in existence in the United States on January 1st, 1940!

In short, the industry has done a job equivalent to doubling the nation's machining capacity in two years. I use the word equivalent, because a part of the new machines have gone to England.

And remember too that this vast, newly-created machining capacity possesses the accuracy of performance for national defense production jobs. Only a part of the older machine tools can be used for national defense—*all* of the new machine tools are built to be utilized for that very purpose.

On the basis of specific examples with which I am familiar, and others which have been reported to the Machine Tool Builders' Association, I am inclined to believe that new machine tools have increased productivity in a ratio greater than 3 to 1. Let me give you some illustrations.

Here is one in terms of dollars, reported to us by a division of the Government. They tell us they find it cheaper to turn one particular torpedo part on a new $3000 lathe than on an old-type $500 lathe. This means that the new lathe must be turning out the work with well over six times the speed of the old lathe.

Here is an instance in which accuracy as well as speed of production plays an unusually important part. Before the defense emergency occurred, an aircraft engine company was experiencing rejections of from 47 to 49 percent in turning the surface of bevel gears. Today, with the installation of new lathes with proper attachments, machining time has been cut to one-third and rejections amount to only from 2½ to 3 percent.

An automobile company engaged in national defense work reports that with modern heavy lathes a forming operation on upset dies that used to take three to four days is now done in from three to four and half hours.

Fred Dull
"This is no time to argue."

Special-purpose machines provide of course one of the most interesting examples of increased productivity.

A special horizontal drilling machine, for instance, in the plant of an aircraft engine manufacturer, performs 35 operations which formerly required eight machines and does the work in 24 minutes instead of four hours.

Another example is a vertical multiple spindle drill in an aircraft engine plant that does in 17 minutes what used to take two machines an hour and 18 minutes. In this plant there is also in operation a new vertical multiple spindle drilling machine for back-counterboring that drills 20 holes at once and does in 65 minutes what used to take six hours and 40 minutes.

Before the emergency a company making aircraft parts was grinding valve-seat inserts. With the emergency a centerless grinder was designed for plunge grinding that particular job. Production was 200 parts an hour—production on the new machine is 1500 parts per hour.

A company making airplane propeller shafts now has in operation a new five-spindle drilling and reaming automatic that does in 40 minutes what used to take three hours and 22 minutes.

Some of the multiple-operation machines designed for special defense production jobs seem almost incredible even to machine tool builders themselves. One typical example is an 11-spindle machine, described in the October issue of TOOL ENGINEER, used in the manufacture of the Packard-Rolls-Royce engine. This machine rough bores five diameters in each of the two angular cam drive shaft holes and forms radius in bottom; rough bores central hole between the two angular holes just drilled; rough bores starter extension bearing hole; rough bores one magneto hole; rough bores and chamfers starter hole; rough bores and chamfers Inertia Starter hole; rough bores fluid pump hole and three bearings in line and chamfers them; rough bores, counterbores, chamfers, and spotfaces supercharger pump hole; rough bores and chamfers oil pump hole; rough bores two diameters in one magneto hole and one diameter in back of opposite magneto bore and chamfers it.

I could continue at great length with examples of this sort. But there is no need to tell this audience about the performance of today's machine tools. You are not only perfectly familiar with this picture, but you have contributed immensely toward its accomplishment.

Effective Tooling

A machine is no more effective than its tooling. Good tooling requires first-class production engineering just as much as does the actual building of the machine tools themselves.

I know that every builder of machine tools will agree with me when I say that the work Tool Engineers are doing in order to gain really effective

tooling of both new and old machine tools has added enormously to the productivity of the machines of this country and is a vital contribution to the defense program of the United States.

In conclusion, I want to urge a course of action that may sound strange coming from a machine tool builder. I want to urge you to do everything you possibly can to adapt old machine tools to national defense production jobs.

This has to do with the all-important factor of time.

I don't have to explain to you that it takes time to make machine tools. No matter how many shifts we work, no matter how rapidly we expand our facilities, we cannot turn out machine tools over night. A period of months must inevitably elapse between the time plans are made and the time the machine tools are actually delivered. And those months are precious.

If we had time, it would be far more efficient to wait until tomorrow's new machine tools were built. But we have no time. Hitler is on the march. England needs aid now.

Time Begins Now

Therefore, every old machine tool which you can help to adapt to national defense production means just that much more time gained today.

It is no longer a question of the best way to do it. It is a question of any possible way to get it done.

I want to emphasize this point particularly because it makes it necessary for all of us to revise our thinking in some respects.

All of us have been trained to think of time in terms of money. Saving production time meant a saving in production costs. Today a saving of time may mean the saving of civilization.

Time saving in the sense in which we formerly have used the terms starts when the machine is on the floor and goes into operation.

Today we can't think of time in those terms. Today time begins right now.

We can no longer think of a production job purely in terms of time saved in the actual operation on the plant floor. We must think of time in terms of greatest possible production in the least possible time *from today on*.

Let's take a practical illustration—a part for a proposed new tank.

We can build a special-purpose machine for machining this particular part that will cut production time to, let us say, one-tenth of what it takes on existing machines.

But to build this special machine would take six months.

My point is that if the manufacturer sits back and waits for six months to get that special machine, he isn't saving time. Not today.

He should put that job on his present machines, adapting them to the purpose, and make what he can while he is waiting for the new special-purpose machine. He may be using a lot more production time on the old machines than he would on the new machine, but he is saving time from the standpoint of national defense.

Now I think all of us, and many manufacturers too, have been following too much the old pattern of efficiency production which, as I said, has been what we have all been trained to do. The result is that in some cases we have been losing time waiting to be able to save time.

Start on Old Machines

So if you can't get new machine tools to do the job, start it on old machines. The new machines will be there as soon as we can possibly get them built—and in the meantime every bit of production done on old machines is just that much more for defense.

This war is a war of industrial production. Today it takes from 16 to 18 men behind the lines to maintain one soldier at the front. Those 16 or 18 men are production men. It is up to the Tool Engineers and the machine tool builders to see to it that these men have the facilities they need in order to give the men at the front the mechanized equipment which is absolutely vital to defense.

What we have before us in this country is the biggest production job that has ever been undertaken in the history of the world and it must be done faster and better than it can possibly be done by any regimented country.

It is up to us to prove that people living in a democracy can produce more, and in less time, than people living under a dictatorship. That's part of our job—yours and mine, for the duration.

To that purpose we have dedicated the full measure of our resources and our ingenuity.

NEW METHOD OF FABRIC ATTACHMENT USED ON BELL AIRACOBRA

Successful results from more than a year of use in the mass production of the Airacobra plane, together with an intensive test program under U. S. Army Air Corps supervision which began early in 1940, have caused Bell Aircraft Corp. to announce its intention of licensing, for use by other manufacturers, a new method of attaching fabric to control surfaces of airplanes. Further investigations have indicated that the method developed may have broad applications in other types of industrial manufacture.

This ingenious method of fabric attachment employs the use of a special tool which forces thin retainer strips into extrusions in the rib construction, thus holding the fabric covering tightly in place. Only a small amount of pressure is required, and the fabric is held tightly, but without danger of tearing.

Fabric Attachment
Thin retainer strips hold.

Direct benefits to be gained from this method include important savings in production costs, increased speed of production, and a resulting attachment which is stronger than the conventional one. Tests conducted by Bell Aircraft, under Air Corps supervision, show the increased strength of the attachment, as well as the fact that as additional pressure is applied, the retainer grips more tightly, without marring the fabric. No holes are made, and patches are not required over the retainer. Time studies show a saving of approximately 75 per cent over the conventional stitching procedure, and of 50 per cent over the sheet metal-screw attachment systems now available, it is said. Unskilled labor may safely be employed for this work.

TOOL ENGINEER DATA SHEET

FIRE PRECAUTIONS IN MACHINING MAGNESIUM

By A. C. Siegel, General Foreman, Airplane Division, Curtiss-Wright Corp.

DURING MACHINING:

1. Keep machine and floor reasonably clean.
2. Place at each machine a large container (approx. 6 cu. ft.) of G-1 (made by Dow Chemical) or soapstone for smothering ignition.
3. Do not permit magnesium dust or chips to accumulate on clothing or person.
4. Do not allow chips to accumulate on machine or floor. Remove chips continuously. Store them in a covered metal can.
5. Keep cutting tools sharp and the proper cutting angles.
6. Take heavy cuts. Extremely fine cuts may cause ignition at high cutting speeds. Back up tool from revolving work when not cutting.
7. Use a cutting lubricant when using magnesium castings with metal inserts.
8. When cooling is necessary, use compressed air instead of a liquid cooling agent.
9. ABSOLUTELY NO SMOKING.

DURING GRINDING:

Grinding dust is easily ignited, therefore, the following precautions should be rigidly enforced:

1. ABSOLUTELY NO SMOKING.
2. Equip each machine with a 6 cu. ft. container with cast iron turnings (or dry sand). Keep floor and machine reasonably clean.
3. If possible use lubricant, or water if no lubricant is available.
4. When grinding without lubricant or water, use grinding dust exhausting equipment with high air speed (80-100 ft. sec.) and precipitate grinding dust with water immediately after leaving grinding wheel.
5. Occasionally, minor grinding operations may be done without lubricant or exhaustion. DON'T ALLOW GRINDINGS TO ACCUMULATE ON MACHINE, FLOOR, or CLOTHING.
6. It is recommended that an easily removable apron be worn by the operator.
7. Avoid sparking. DO NOT GRIND STEEL ON THE SAME WHEEL ON WHICH MAGNESIUM IS GROUND. Use magnesium or aluminum plates for grinding tables.

IN CASE OF FIRE

The spread of ignition is rather slow. There is no explosion. Fires are easily extinguished if the following recommendations are followed:

1. DO NOT USE WATER.
2. Localize the fire and scrape away adjacent turnings.
3. In its initial stage, the fire may be smothered by covering with iron plate or pressing out with asbestos cloth.
4. Smother with cast iron turnings or dry sand (preferably with the former as sand may injure the equipment).
5. DO NOT USE ANY OTHER TYPE OF FIRE EXTINGUISHER.

NOTE: This is the first of a series of Data Sheets which will be published in THE TOOL ENGINEER hereafter. A handy three ring binder can be secured at any book, stationery, or dime store and will hold the sheets for convenient and frequent reference.

Ford R. Lamb

FORD R. LAMB, Executive Secretary, Past President, Charter Member and for years guiding spirit of the American Society of Tool Engineers, died at his home in Pinckney, Michigan, Sunday, October 26th, at the age of 50.

Born in Williamston County, Michigan, on June 28, 1891, he attended the Perry, Michigan High School, Lansing Business University, and took various extension courses at Cass Technical High School in Detroit untll 1916.

Following a few years in various jobs, learning the fundamentals of tool designs, etc., he joined Studebaker Corporation in 1920, working his way up to Assistant Production Engineer in 1927. While with Studebaker in the Methods and Standards Department he had acted as Apprentice Instructor, in which capacity the seed of what later was to become his life's work first germinated.

He left Studebaker and joined the Detroit College of Applied Science as Instructor in Tool Design and as Treasurer. Here he found a kindred soul, O. B. Jones and the two frequently discussed the need for a new Science and Pro-

fession to fill the gap between strict "Engineering" and "Production".

Having invented a 'stud setter' in 1928, he took his invention to the Consolidated Machine Tool Corporation with whom he was connected in the capacity of Sales Engineer until 1937. He also operated in Pinckney a small production shop making auto parts and door checks. In the meantime, O. B. Jones had, around 1931, set up at the Detroit College a "Society of Tool Engineers" composed mainly of students.

In 1932, Jones conceived the idea of creating a national technical society based on the new science. It was natural that the first one he called was Ford Lamb, and Lamb, Jones, and 31 others met on March 23, 1932 to organize the American Society of Tool Engineers, Lamb becoming a member of its first Board of Directors.

In 1936 he was elected President of the Society—its fifth. When his term of office expired in 1937, the Society was loath to see him relinquish office. It offered to him a new post—that of Executive Secretary of the A.S.T.E.

To give his full time to his life's ambition, Lamb resigned his position with Consolidated Machine Tool Corp., and threw himself whole-heartedly into his new work. Even in 1938, the A.S.T.E. was still a small struggling organization, with but fourteen chapters and less than 1600 members. Under his 'management' it soon began to attract attention from industry. A Machine and Tool Progress Exhibition which he staged in Detroit for the A.S.T.E. in 1938 startled industry with its scope and attendance. Another in 1939 dwarfed that of the previous year to such an extent that it attracted nationwide attention.

To Lamb it was a means toward an end. He was fighting for recognition of a new Science and Profession, of Tool Engineering. Early, he had recognized that Tool Engineering, to take its rightful place among Professions, would require a change in the national educational system.

Men were still obliged to become Tool Engineers the long hard way—through the shops of industry, through tool design departments. Only a handful of technical schools in the country could and would teach Tool Engineering.

To ease this road for the youth of the land became his new focal point and he lived to see the final goal in sight. Already, The Society, which now had grown to 42 chapters and over 8,000 members, had evolved a new curriculum for high schools which was beginning to attract attention nationally. Already discussions were under way with leading Universities looking toward the setting up of College Courses in Tool Engineering, when he was taken ill.

Another show, early this year, proved too much for him. Designed to help the nation with its Defense tooling problems, it was the most spectacular thing of its kind ever put on, so much so, that the Exhibit Managers Association elected him a Director. From the strain of seeing it through, he never quite recovered. On August 2nd he was taken ill. An operation failed to save him and he passed away at the age of 50 on Sunday morning, October 26th, at his home in Pinckney, Michigan.

He is survived by his widow, the former Lulu Smith, whom he married in Perry, Michigan in 1914, and five children: William Bert, 26; Gordon Raleigh, 25; James Arthur, 23; June, 22; Ross Oliver, 14; and Ford R., Jr., aged 2.

Fitting tribute to his life's work is that the Past Presidents of the American Society of Tool Engineers acted as honorary pall-bearers at the funeral, which was held from the Pinckney Congregational Church Wednesday, October 29th.

Founder and Past Presidents Join in Tribute

I was closely associated with Ford Lamb for 22 years. He was my idea of a well rounded man possessing knowledge gleaned from Farming, Drafting, Tool Making, Teaching, Accounting, Engineering, Selling and Business Management. He worked hard and played hard and enjoyed every bit of it. He loved dogs, women, men and children and was loved and respected by them as well as his own townspeople, which is the best you can say of anyone. The worst I can say is I counted Ford Lamb as one of my three best friends.

O. B. Jones—Founder

My early association with Ford Lamb was one of most pleasant business relations. Later through the organization period of our Society I knew him to be a very diligent worker, a good planner, and a wise counselor and during his regime as President and Executive Secretary he unquestionably did more toward the Society's phenominal growth and expansion than any other member. He enjoyed committee arguments and when voting was always guided by righteousness. Mr. Lamb was an engineer of high rank and his many friends will mourn his passing greatly.

J. A. Siegel—First President

From the very beginning of the American Society of Tool Engineers, Ford Lamb took an active interest. He was always willing to serve in any way he could. His untiring efforts helped carry the Society through many discouraging crises and changed many apparent failures to real successes. His ability coupled with his pleasing personality, his honesty and his integrity won for him a place in the hearts of all with whom he came in contact. In his passing we have lost a true friend and a capable engineer.

W. H. Smila—Second President

After many years of pleasant acquaintanceship, my full appreciation of Ford Lamb reached its height during the year he served as Vice-President with me. No job was too great, no detail too small to merit his careful consideration. Our Society's growth and prestige can be attributed in a great measure to his sincere efforts.

T. B. Carpenter—Third President

The loss of Past President Ford Lamb is an irreparable loss to our Society and the Tool Engineering profession. Having worked with him during those early days shortly after the founding and formation of our Society, I realize full well the tremendous influence he had in shaping the growth and prestige which the Society now enjoys. He gave unstintingly of his time and thought and today the Society itself, for which he gave his all, stands as a monument to him.

R. M. Lippard—Fourth President

During my close association with Ford Lamb, Past President and late Executive Secretary of the A.S.T.E., I found him all that could be desired in a friend. His loyalty to his organization, his family and friends won the respect of all who knew him. Together we watched the A.S.T.E. grow from a small group of local Tool Engineers into a national organization, and I appreciate much of our progress is due to the executive ability, fine organization methods and sincere and untiring efforts of Ford Lamb. His untimely passing is a great loss to all of us and to the organization he worked so diligently to build.

F. A. Shuler—Sixth President

The Society has sustained a great loss in the passing of Ford Lamb. Words fail to adequately describe the untiring energy he always displayed in his endeavors to shape the destiny of our Society. We shall always glorify his memory as we continue our rapid growth—conscious that through much personal sacrifice he guided us over many difficulties and perplexities. The reflection of his indomitable courage to support that which he thought right in principle and his loyalty to the Society will last forever.

W. F. Wagner—Seventh President

It is very difficult for me to express my feelings in the passing of Ford Lamb. He was my true friend and an exeremely loyal supporter during my term of office as President. The American Society of Tool Engineers has lost a valuable member and worker as no one has done more for the Society than has Ford Lamb. He will be sincerely missed by those who really knew him.

J. R. Weaver—Eighth President

In the passing of Ford Lamb to a better life, our Society has lost a real friend and at the same time suffered a severe loss. During the past two years it has been my pleasure and privilege to be closely associated with Ford in connection with Society affairs, always finding him most cooperative as well as offering many splendid suggestions that have resulted in a bigger and better Society, enjoying an increased and well deserved prestige. The American Society of Tool Engineers always will be a living monument to the memory of our Executive Secretary and Past President.

A. H. d'Arcambal—Ninth President

With the passing of Ford Lamb, A.S.T.E. has lost its best friend. He was a Tool Engineer in every sense of the word, a business executive with lots of capabilities and an excellent organizer. These qualifications, all wrapped together, made him, without any doubt, an ideal executive secretary for our Society. We shall miss his excellent guidance and support, but will never forget the splendid services he rendered to our Society. F. W. Curtis—Tenth and Present President

German Production Methods

Working with frantic passion, Germany built, before the war, a mammoth aircraft industry. This eye-witness account tells of some of the production methods used when the war began.

By A. T. LUNDGREN

TODAY the newspapers and magazines are full of information pertaining to the production methods which are used abroad. How much is propaganda, how much is fact, and how this affects the actual seriousness of the situation in the defense industry is hard to say. In any event, it is most important that we do not underestimate the strength and skill of a potential adversary.

The average man on the street does not realize the seriousness of our present situation. Today we should be willing to back up our thoughts by action in the best way that we know.

During 1937 and 1938 I was fortunate to be with a Swedish airplane company and I had an excellent opportunity to study the German methods of manufacturing as the company I was associated with was building Junkers airplanes under license for the Swedish government.

Late in the fall of 1937 I visited the Bristol company and the Hanley Page company in England. At that time they were in the same position with their manufacturing program as we are today.

On several occasions during the year 1938 I went to Germany and spent some time in the Junkers factory which was one of the largest of the German aircraft companies. At that time they were the mainstay of the whole German aircraft industry.

One of the things that impressed me in this plant was their remarkable organization and the coordination which existed between the various departments. If anyone visiting the engineering department, for instance, should ask a question which would momentarily stump the engineer, he would immediately contact an associate who would produce the correct answer. This efficiency was brought about by departmental coordination similar to our present Boeing, Douglas and Vega set-up, and yet this happened four years ago.

Plant Scattered

The size of this factory was enormous and the buildings were scattered a half mile or so apart over a large area and the buildings were staggered to protect them from bombing raids. Another branch of the company would be situated about fifty miles away and would be devoted entirely to the manufacturing of tail surfaces, while another factory in some other little town would concentrate on the building of wings. They also had jobbers all over the country turning out individual parts. For instance, a blacksmith and his helper, living way out in the country, were turning out parts to be used on certain installations. This was the way they were handling their production four years ago, manufacturing in several places and then bringing all of their component parts into one large assembly plant for final assembly and flight test.

In comparison with our equipment today, the Junkers shop was modern, especially in regard to machine tools. The machine shop alone in this company would take up almost half the space of the Boeing No. 2 plant. It contained a large number of shapers, hundreds of lathes, and milling machines which were all lined up on the floor in military fashion.

It had a large warehouse for raw materials, and in this warehouse there were miles and miles of material. I was told that this had been stored up for the war that was to come. Stores of raw material, tools and finished parts were located around the factory in open cribs without any type of protection. When I inquired about the possibility of men stealing from these stores, they answered that they put padlocks on their concentration camps and not on their stores.

I noticed that they used carbide tools extensively and they claimed that it paid returns. Tantalum alloy and tungsten alloy carbides were used for cutting tools. Zinc, magnesium and laminated wood were used to a large extent for forming tools.

All work was done on a piece-work basis and there was competition all the time between departments to produce the largest amount of parts. Charts were kept showing the reduction of waste and great pride was shown when savings were accomplished along this line. There were also charts showing the price of new material and what they could get for scrap.

Charts were also kept in the cutting shops with instructions regarding the

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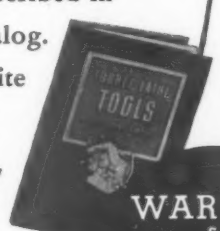

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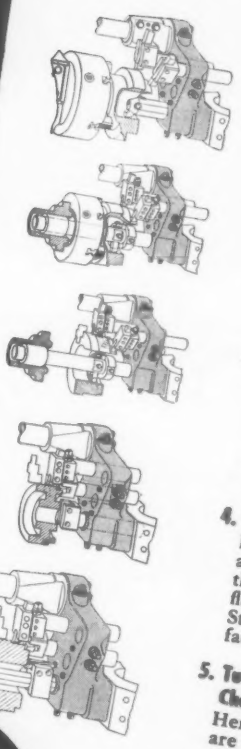
WARNER & SWASEY Turret Lathes

5 Ways to Use the Multiple Turning Head for Stepping Up Production



1. Turn Two Diameters and Bore
Here the Multiple Turning Head takes three cuts. An Angular Cutter Stub Boring Bar bores the blind hole. The two diameters are turned by Reversible Straight and Angle Cutter Holders.

2. Turn Two Diameters and Pilot Bore
Two Reversible Adjustable Angle Cutter Holders in the Turning Head turn two diameters of almost the same size; the Pilot Boring Bar bores the hole.

3. Turn Two Diameters, Chamfer one Diameter and Bore
Two diameters are turned with Reversible Adjustable Angle Cutter Holders while a Reversible Straight and Angle Cutter Holder chamfers.

4. Turn Two Diameters and Slab Face
Here two diameters are turned and the front "slab-faced." At the end of the turning cuts, one flat cutter in the Reversible Straight and Angle Cutter Holder faces the front of the casting.

5. Turn Two Diameters, Bore and Chamfer Hole
Here two operations on the hole are combined on one bar while two turning cuts are taken on the outside diameters. The hole is bored with an Angular Cutter Stub Boring Bar equipped with a Chamfering Head which chamfers the hole.

care of scrap. If there was any stock left over after shearing operations, for instance, it was placed in a rack to be used later on smaller parts.

They had an experimental plant in which they were developing the Junkers 88 about which we read so much in the papers. I tried to gain access to this department, but was politely turned away. Practically all parts designed for production and preliminary design pass through this department.

The products they were turning out in 1938 were very good, although a great deal of their work was hand formed with the use of small and special tools, and they did not use hydro-presses to the same extent we do. They also used conveyors extensively on their assembly lines. A lead man stands at the head of the work benches, controlling the conveyor, and at his command the conveyor moves up. Therefore, each man must do his job in order to keep up; if he doesn't, he is replaced.

In this process a great many traveling jigs are used, and by the time the sub-assemblies are completed in the various skinning jigs, etc., they combine them into other larger units. They are advanced in their ideas of standardizing units and jigs by rigging them up, using, taking them apart and setting up another jig. They put a lot of importance on labor saving devices when making jigs. They do not use structural steel on all their large fixtures and jigs as we do, but instead use sheet metal which is made on the brake into a "U" channel and welded into hollow sections. The object of this is to conserve material and make use of the cheap labor of young boys who have been trained to become welders.

Most of the labor comes from large training schools which train men for all around duties. The men are then placed in three different classes—skilled, semi-skilled and unskilled. These men come from all walks of life; they have found, for instance, that barbers make very good sheet metal workers. They also use lots of women in their factories and they have proved quite satisfactory on repetitive operations such as in punch presses.

Working Conditions

In regard to the working conditions, there were no restrictions on hours of labor, and naturally the men were not getting much money. Because of the low wages and unrestricted working hours, in one factory the men chose to work long hours, and then rest upon cots furnished by the company. All the unions had been disbanded by Hitler.

Few of us realize the frantic passion with which these people have taken to the Nazi movement, and I really think we have to comprehend that before we can see the picture, and we would also have to understand how thoroughly organized the movement is.

Statements have often been made that the manner in which the Nazis are operating will tend to produce discontent and give rise to possibly armed opposition. But there is no chance for dissension as very close tab is kept on each man and each group of men by assigned leaders who work among them, many of them secretly. In one case, I noticed that one of the working men wore boots under his coveralls. During the lunch hour I was surprised to see him remove his coveralls revealing a smart uniform underneath. He then proceeded to make a pep talk which was met with loud applause.

I left Germany impressed by the picture I had seen, yet I believe that because this country is so highly productive, and even overlooking the fact that the Nazis have six years' head start on us, we should still be able to overtake them, especially if "we get off the dime" and do something about it.

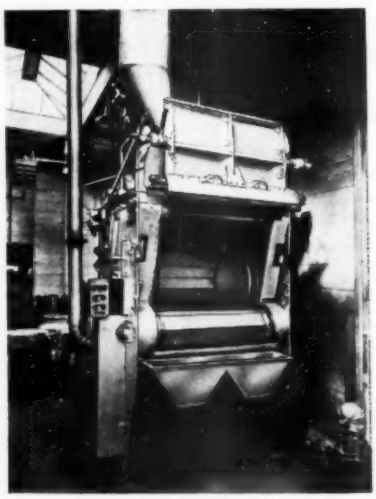
At the present time we need most of all national unity and we must realize the seriousness of the problems which confront us. We must forget about our own private troubles and keep up our fighting spirit, and I am sure that we can do the job in grand style. However, the one thing we must all remember is not to underestimate the strength of our potential adversary.

Let us all put every effort behind the task which we have been called upon to do, whether it be designing airplanes and tools, or trying to roll finished airplanes out through the back door of the factory. If you provide the best tools that you can devise, the rest of the boys will thank you and will put them to good use, and none of us will have to worry about what the outcome will be.

Ingenious Barrel Loading Device

At the Palnut Co., Irvington, N. J., a blast cleaning operation to remove sand and scale is the final processing step in the manufacture of their metal parts.

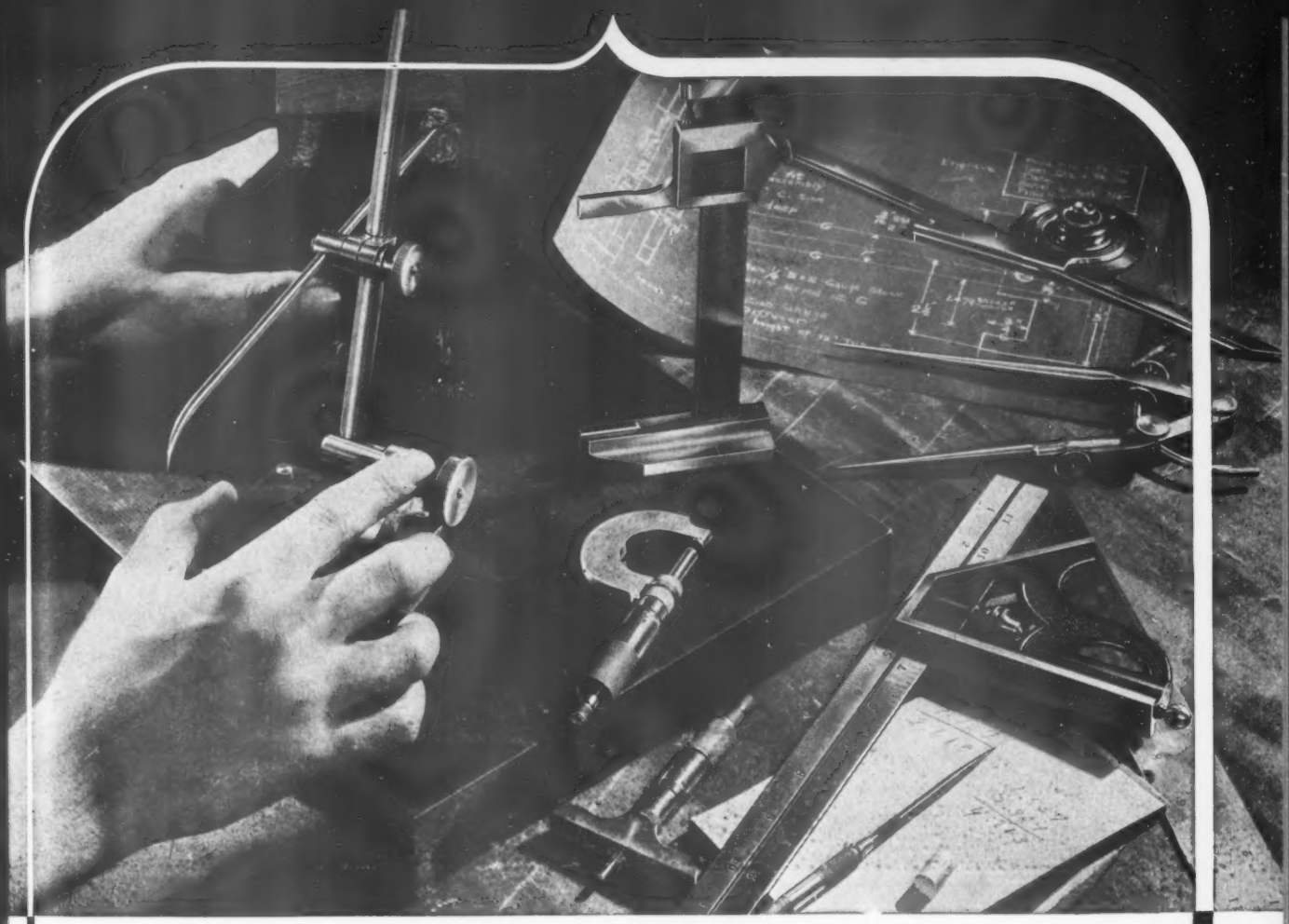
After the few minutes blasting time required, the cleaned parts are unloaded directly from the airless abrasive blast cleaning machine into shipping barrels. To prevent spillage of the small pieces in loading the barrels, a simple double hopper trough feed was devised. This is fastened across the front of the unloading chamber of the Wheelabrator Tumblast. Since it is slightly wider than the discharge mouth of the machine all parts fall through the trough into the two barrels.



With the addition of this ingenious barrel-loading arrangement, the Palnut Co. eliminated the extra handling required through the hauling of cleaned material to the shipping department in containers and then later transferring the parts into shipping barrels.

In cases where parts are cleaned which demand further processing after the blasting step, this trough does not interfere with their discharge from the Tumblast to any other kind of suitable tote boxes for conveyance to other departments in the plant, it is said.

Barrel Loading Device (Left)
Two extra handlings eliminated.



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PRODUCTION PERSPECTIVES...

News of Mass Manufacturing Everywhere

THE Federal Reserve Board index of industrial production for September was 160 compared with 160 in August and 127 in September, 1940.

The SPAB on October 1 at Washington approved an OPM plan to increase the nation's steel producing facilities by 10,000,000 tons at an estimated cost of $1,250,000,000. SPAB officials said that the huge expansion program, which would increase present steel ingot capacity from 89 million tons to 99 million tons a year, would "virtually all be Government financed."

A contraseasonal increase in claims for unemployment compensation has reflected a new trend toward "priorities unemployment", the monthly business review of the Federal Reserve Bank of Cleveland reported October 2. Companies making civilian goods were forced to make withdrawals from heavy inventories when they encountered increasing difficulties in obtaining raw materials. Shipments of large quantities of semi-finished products to Britain has left less raw steel available, resulting in temporary layoffs in finishing mills. August payrolls at 6500 Ohio concerns, however, were 53 per cent larger than a year ago, the bank says.

Civilian Supply Chief Leon Henderson on October 15 ordered next January's automobile production cut "at least" 51 per cent below the output of January, 1941. "OPM officials did not wish to imply by establishing lower allotments for January that materials would be available even for such a smaller output", his office said.

The 10 largest American steel companies did a total business of $2,931,000,000 in 1940 compared with $2,255,000,000 in 1939, the SEC reported at Washington October 17 in the first of a new series of corporate studies. Dividends paid out in 1940 aggregated $114 million compared with $57 million in 1939, while undistributed profits were $128 million and $64 million respectively.

The entire defense program may be impaired next year unless freight car and locomotive builders can secure a constant flow of steel, the National Association of Manufacturers warned October 15. During the next few weeks the defense program will provide a severe test for the nation's transportation facilities and larger shipments of goods in 1942 may create a temporary transportation shortage, the association said in the first of a series of studies of vital defense industries. Meanwhile the Department of Commerce says that the key to increasing rail freight capacity this fall above the current rate of operation rests almost entirely upon improving the efficiency of freight car utilization through shipper and railroad action. The extent to which the freight car supply can be augmented through new construction and repair, it is pointed out, is necessarily limited.

THE upward trend in living costs continued during September when increases were noted in each of the 60 industrial cities surveyed monthly by the Conference Board. The board reported that increases over the August level of living costs ranged from a low of .8 per cent in Cleveland to a high of 4.9 per cent in Oakland, California, with 16 cities showing increases of 2 per cent or more and only three less than 1 per cent.

Sweeping price and wage control regulations for Canada were announced October 18 by Prime Minister W. L. Mackenzie King. Beginning November 17, no person will be permitted to sell any goods or supply any service at a price higher than the maximum charged in the four weeks from September 15 to October 11, King said. Henceforward no employer in Canadian industry or commerce may, without permission, increase basic wage rates. "The action represents an experiment hitherto untried on this continent, and perhaps, having regard to its breadth and variety, hitherto untried by the will and consent of any free people anywhere." Every employer will be obliged to pay a bonus in accordance with the terms specified by government order and to adjust the bonus regularly every three months in accordance with a definite formula.

Cleveland has launched a $100 million factory expansion program in the first three quarters of 1941. Employment is highest in the city's history, and despite warnings of possible layoffs because of material shortages and priorities the last reports show that job totals continue to point upward. About 40 per cent of this city's productive effort today is devoted to national defense. This is far ahead of the current national estimates of 15 per cent, and the proportion continues to advance as the rearmament effort gains momentum. With its customers largely other industries, Cleveland this year will produce about $600 million worth of defense materials.

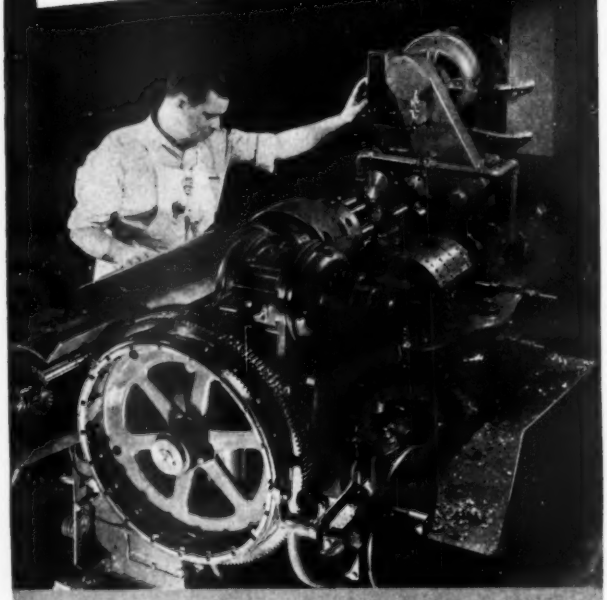
Cleveland factory managers on October 15 looked forward to 1942 as the time when the all-out prosperity party will be

A STEP IN THE RIGHT DIRECTION

Drawn for THE TOOL ENGINEER *by Ted Petok.*

News Item: OPM, in its first industry wide certification, gives special treatment to 34 companies in the washer and ironer industry.

BAUSCH & LOMB OPTICAL CO.
INCREASES PRODUCTION
WITH CLEVELAND MODEL 'A'



● There is probably no other type of machine that requires greater precision in its manufacture than the navy range finders made by Bausch & Lomb Optical Co., at Rochester, N. Y. Accuracy of navy gun fire depends largely upon determining the distance from the guns to the target, which is the sole function of the range finder itself. Its accuracy in turn depends entirely upon the precision fit and functioning of its parts, some of which are made on Cleveland Automatics. A 2½-inch capacity Model A installed at Bausch & Lomb is shown here, one of several recently purchased to increase production of short runs of small lots of parts. "Very satisfactory performance," say B & L production men. May we send you more particulars about Model A Single Spindle machines?

THE CLEVELAND AUTOMATIC MACHINE COMPANY
2269 ASHLAND ROAD, CLEVELAND, OHIO

Sales Offices at:
Newark, 15 Washington Street • *Detroit*, 2842 W. Grand Boulevard
Chicago, 565 W. Washington St. • *Cincinnati*, 507 American Bldg.

CLEVELAND
Single Spindle
AUTOMATICS

over, when there may be little left of civilian business-as-usual except a hangover. David R. Jones, president of the Geometric Stamping Company, said it is entirely possible that passenger automobile manufacturing may be shut down completely in 1942 because so far no priority rating has been assigned to steel for pleasure cars.

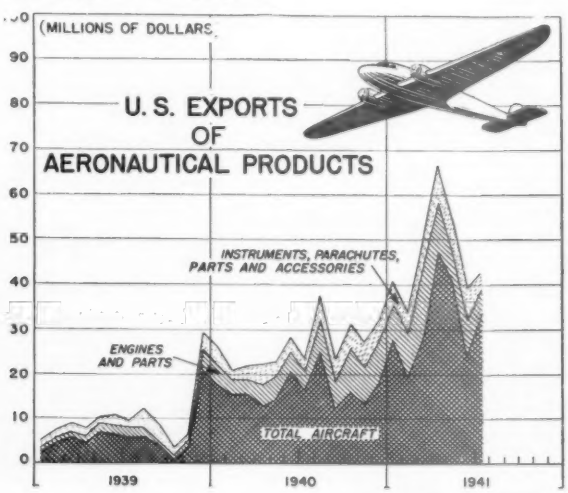
Republic Steel Corporation and American Rolling Mill Company on October 18 were granted permission by the federal government for construction of important new facilities. Negotiations now under way with OPM provide for a new $5,140,500 Republic plant at Canton. The announcement of these plans October 18 came from the Defense Plant Corporation in Washington, which will pay for building the plants and retain title to them. They will be operated by the companies under lease.

More than $5 million of defense work was placed with Massachusetts smaller industries at the National Defense subcontracting clinic, in Worcester, Massachusetts recently where representatives of 60 prime industries conferred with owners and agents of some 2,000 small manufacturers. That the clinic was a striking success was attested by the fact that 17 small manufacturers from Brockton received work contracts to keep them busy for some time, within an hour after their appearance in Worcester. Gov. Saltonstall, principal speaker at a luncheon in the Memorial Auditorium, where the clinic was staged, declared that "Yankee ingenuity is one essential remedy for the present trouble." He asked for teamwork among manufacturers, workers, and Federal agencies.

For the fourth consecutive month employment in Western Massachusetts hit a new all-time high during September, according to the Employers' Association of Western Massachusetts. The association's employment barometer, based on reports from 23 metal industries in Western Massachusetts, showed that 30,834 people were employed in those industries at the end of September as against the previous all-time high of 30,310 in August.

The C.I.O. Steel Workers Organizing Committee announced October 18 at Buffalo, N. Y., signing of a contract with the American Car & Foundry Company, scene of two strikes within the last six months over employe representation. The company, producing artillery shells, granted a 10-cent hourly wage increase.

An expansion program for the eighth consecutive year is announced by Ampco Metal, Incorporated, Milwaukee, Wisconsin, producers of Ampco Metal and other bronzes. Plans are in progress for constructing two more additions. These are a machine shop and a forge shop addition. Work will start this fall, and $250,000 has been authorized to construct and equip the new projects.



NEW Carbide Tool GRINDER

with Features you have *always* wanted!

POINT for point—including its surprisingly low price, massive design and construction — you will find this DELTA-Milwaukee carbide tool grinder incorporates the things you have always desired in a machine of this type.

Designed to insure accuracy and long life—manufactured by modern precision methods — so low in cost that it can be used in any shop, large or small. It is equipped with one No. 60 Silicon-carbide wheel and one No. 120 grit Silicon-carbide wheel, the first for preliminary grinding — the second for producing a perfect cutting edge. So accurate is the machining on this grinder that it runs absolutely true, free from vibrations so that accurate, delicate grinding can be done.

1 Table tilts 30 degrees toward wheel. Note convenient indicator which shows exact angle at which table is set.

2 Table tilts 45 degrees away from wheel. Table is clamped in place by two large convenient star wheels below sub-base.

3 Easy to clean this grinder! Table and sub-base easily removed by loosening only two bolts. Sludge scraped and washed away in a jiffy.

4 Pencil test. This unretouched photo shows ordinary drawing pencil standing on edge of table with grinder going full speed. No vibration here!

5 Grinding gage with tilting graduated head rides in ½" x ⅜" groove in accurately machined table. Groove will also take special fixtures.

SPECIFICATIONS

This new Delta Carbide Tool Grinder has 13½" x 8" tables with ½" x $\frac{3}{16}$" grooves for fixtures. Tables tilt 30° toward wheels and 45° away from wheel. Supplied with one No. 60 Grit and one No. 120 Grit Silicon Carbide Wheel. Wheel sizes: 1" wide x 6" in diameter with a 1" face, and a 1½" hole. (Standard Diamond Wheels can also be used).

Reversible ½ H.P. motor with self-sealed ball bearings — lubricated for life. Speed: 3450 R.P.M. with surface speed of 5200 R.P.M. Furnished with one water pot and adjustable light fixture. Sub-base is removable for easy cleaning. Reversing switch built into base. Available with wide range of motors to fit all needs — in choice of bench or pedestal models.

Send for Full INFORMATION

Fill out coupon for full details, specifications and prices on this new Carbide Tool Grinder.

The Delta Mfg. Co., 809-M E. Vienna Ave., Milwaukee, Wis.
Gentlemen: Please rush to me full details and prices on the new Delta Carbide Tool Grinders. Also send copy of latest Delta Catalog of Industrial Production Tools.

Name .....

Address ..... State .....

City .....

DELTA
MILWAUKEE

Tool Engineers Study War Production at Canadian Meeting

NEARLY six hundred and fifty Tool Engineers from the United States and Canada and one member from Australia studied methods of war production at the Semi-Annual meeting of the American Society of Tool Engineers held in Toronto, October 16, 17 & 18.

Under the general chairmanship of Arnold Thompson, the meeting was sponsored jointly by the Toronto and Hamilton chapters of the Society.

To most of the visitors the most interesting feature of the meeting was the opportunity to observe first hand the methods used in plants engaged in war production. The Canadian Government cooperated admirably and permitted plant visitations.

Canadian Press Censorship forbids reference to actual plants concerned, but the Tool Engineers saw what is said to be the largest machine gun plant in the world, where Bren and Browning guns are made. Other plants included a shell case drawing plant, a fuse or detonator cap plant, one making the British Lee Enfield service rifle, and an aircraft plant making training planes and medium bombers.

Past Pres. d'Arcambal and Com. Strothers
The U. S. Naval Attache at Ottawa and personal envoy of Secretary Knox.

The largest high explosive shell plant in Canada was open for inspection by the Tool Engineers, as was the plant producing the Bofors anti-aircraft gun. On the tours was a plant making the 3.7 anti-aircraft gun barrel, a machine tool plant, one engaged in producing fire control apparatus, and two converted plants. One of these, a bicycle plant, had swung over to the manufacture of machine gun tripods and similar work, and an aluminum utensil concern converted to manufacture of drawn 40 mm shell cases.

Principal speaker of the meeting

First Pres. Siegel and Pres. Curtis
Dues paid for a lifetime.

was the Hon. Clarence D. Howe, Minister of Munitions and Supply in Canada, who spoke at the banquet on Friday evening. He was introduced by Alex Gray, President, Gray Forgings and Stampings, Ltd.

Chairman of this banquet was Frank W. Curtis, National President, who served as toastmaster and introduced those responsible for the successful meeting. Present were Commander Strothers, U. S. Naval Attache at Ottawa representing the Navy and Major Cayouette of the OPM in Washington. Life Membership certificates in the Society were presented to nine past presidents of the A.S.T.E.

A. E. R. Turner, vice president in charge of sales, John Bertram and Sons, presided at the technical session dealing with the old versus new machine tools. Supporting the old machine tools adapted for precision production in this emergency was Arnold Thompson, president, Tool Engineering Service, who was backed up by an unscheduled talk by a distinguished visitor who happened to be in the audience—Thomas Arnold, Canadian machine Tools Controller.

Opposing this stand was Fred C. Dull, vice president of the Monarch Machine Tool Company who spoke upon the advantages of the new machine tools, but really settled the entire discussion when he said that this was a time to use every machine tool we could possibly get, old and new.

Hector Smart, president and general manager of Canada Illinois Tools Ltd., presided at a technical session dealing with the timely subject of getting the most out of cutting tools. Roy T. Wise, Deputy Machine Tools Controller, Department of Munitions and Supply, Canada dealt with the methods of "Making the Best Use of Cutters."

"Carbide Cutting Tools" were the particular subject dealt with by Philip M. McKenna, president of the McKenna Metals Company. The third speaker was Walter Esau, of the E. F. Houghton Company, who discussed the "Proper Use of Cutting Oils."

The third technical session was devoted to the problems of training personnel and H. H. Kerr, Regional Director for Ontario of the War Emergency Classes. Roy M. Sherk, Director of the War Emergency Classes at Western Technical-Commercial School, Toronto spoke on "The School's Task" and Edward Kennard, plant manager at St. Catharines Steel Products considered "Industry's Task".

Consensus of opinion among the many Tool Engineers attending was that the Toronto meeting was the most successful fall meeting in the history of the A.S.T.E.

F. G. Gilbert-Lodge
. . . came from Australia.

DoAll CUTS WHOPPERS

LIKE THIS

1850 POUND DIE

No, it's not a big Wisconsin cheese, but a solid steel die (10" thick, 31" diameter) weighing 500 pounds more than the DoAll Machine on which it was cut in the plant of the Midwest Pipe & Supply Co., St. Louis, Mo.

FASTEST METHOD of Removing Metal

Makes no difference what it is—aluminum, brass, bronze, copper, iron, steel, nickel, zinc—any kind of metal, alloy or plastic—forgings, castings, tubing, blocks or sheets—the DoAll cuts it with savings of time and metal that are astonishing.

Takes the place of shaper, milling and lathe work on hundreds of different jobs in large and small defense and industrial plants everywhere. In addition to internal and external sawing, the DoAll does band filing and polishing.

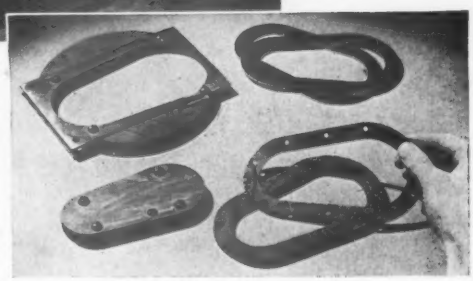
IT WILL PAY YOU to have one of our factory trained men call at your plant to show you what a DoAll can save you.

"GLASS BOOT" DIE PARTS

Here's an assembly die sawed and filed in 90 minutes at the Taylor Instrument plant, Rochester, N. Y. This die makes parts for the famous "glass boot" used in modern hospitals.

DO-ALL
Contour Machine
BAND SAWING
BAND FILING
BAND POLISHING

FREE—Literature and 158-page Handbook on Contour Machining.



3-OUNCE GASKETS

Cutting gaskets—generally a pain in the neck—is easy with a DoAll. The paper is screwed between two plates, the cut made through the plates, maintaining smooth edges on the gaskets.

CONTINENTAL MACHINES, INC.

1304 S. Washington Ave. **Minneapolis, Minn.**

Associated with the DoAll Company, Des Plaines, Ill., Manufacturers of Band Saws and Band Files for DoAll Contour Machines.

War Production in Canada

With more than fifty per cent of the national income going for war purposes directly, Canada's entire economy has been converted to the prosecution of the war.

By CLARENCE D. HOWE
Minister of Munitions and Supply
Canada

IN my frequent visits to our war plants, I have been greatly impressed by the improvement in machine tools since the last war. It seems to me that the machine tool industry, during the last ten years, must have anticipated the present crisis. Your technical knowledge, your mechanical genius, and your vision, expanded during the past ten years, have made it possible for you to produce tools of a class vastly superior to any that were available before that time.

Through the use of your modern machine tools, cutting tools and jigs and fixtures, we have been able to expand our munitions programme to a much greater extent than had been thought possible, at the beginning of the war. We find that young men, without previous mechanical knowledge, and women, and girls can be quickly trained to operate your machines, thus vastly enlarging the supply of available mechanics. Our statisticians tell us that we have already exhausted the supply of labour available to war industries, but I know from my own experience that we still have great reserves of labour to draw on. Our present industrial programme is only about 70 per cent manned, and I have every confidence that the 30 per cent will come forward when required. It is true that we are drawing heavily on peacetime industries for their skilled mechanics, but to a much larger extent we are drawing on groups of untrained men and women, who, after a short period of training, are able to operate these modern tools efficiently.

Canada's Howe and Ally
The country has one objective.

Another striking fact that I have observed is that the rate of output of your modern machines is much greater than had been anticipated. Our new plants were largely equipped from British manuals, setting out machine tool and man hour requirements. After the machinery has been installed, we invariably find that the machine tool requirements are excessive, and the man hour estimate much larger than necessary. The result has been that we have been able to enlarge our production greatly over preliminary estimates of output. In some cases, after some balancing up of equipment, we have been able to double the estimated output of a given factory. I visited a factory a few days ago where the man hours mentioned in the manual for a given unit were 380, and where the unit was actually being produced with 54 man hours. All this was made possible by improvements in machine tools, cutting tools and jigs—all the result of progress in your industry.

600% Expansion

Our own machine tool industry has been expanded about 600 per cent since the war began, but we have at all times depended on a large and sustained flow of machine tools from the United States. The Government of the United States has made Canada a part of that country, as far as the distribution of machine tools is concerned, and we have little to complain of in the matter of deliveries. We still have machine tool shortages in our factories, and we still have buildings built and waiting for machine tools, but, in general, I am told that deliveries of tools to Canadian plants are as nearly up to schedule, as the position of your industry, and its delivery programme generally, would warrant. Certainly this is all that we can expect under present-day conditions.

I have some conception of the strain under which your industry has been working during the last two years, and the pressure for deliveries to which you have been subjected. Obviously, nothing can be done in the manufacture of a war product until tools have

Grinding Taper Seats in Propeller Hubs

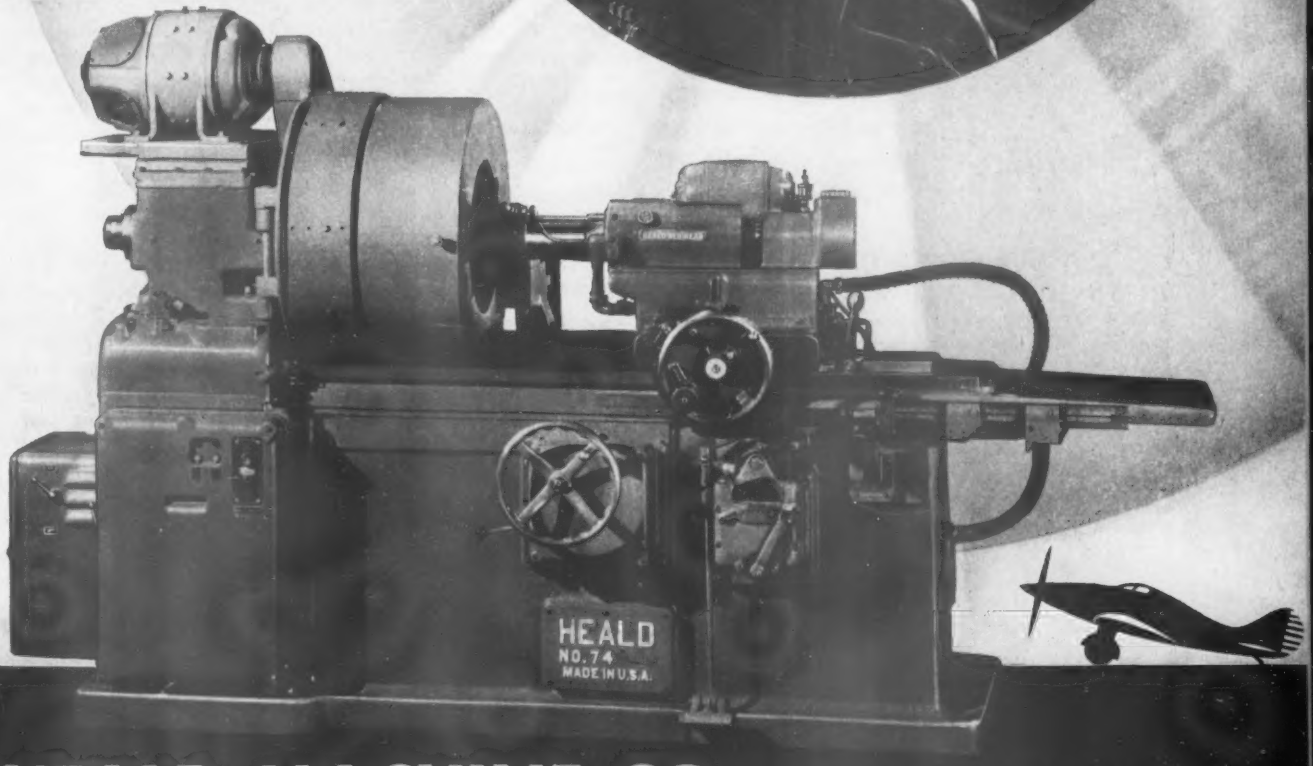
No. 74 INTERNAL IDEAL FOR HEAVY RUGGED WORK

An excellent example of the type of work the #74 Heavy Duty Internal Grinding Machine is suited for is shown in the circle where it is grinding the taper seats in the hubs of aircraft propellers.

Two taper surfaces are finished, a 15° seat and a 30° seat. Approximately .008" - .010" is removed from each surface.

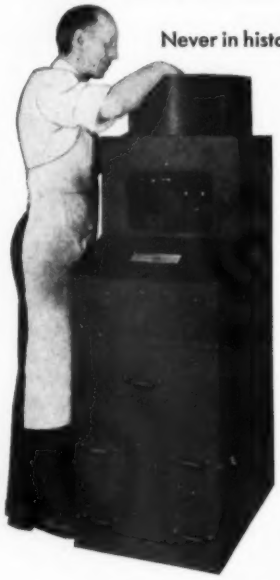
The workhead can be positioned angularly to obtain the desired relation of grinding wheel and work. To quickly obtain lateral settings the workhead is mounted on a hand-wheel-operating cross-slide.

Large gears, rolls, bearing races and other similar work can be readily handled on the #74 Internal.



THE HEALD MACHINE CO. WORCESTER, MASS. U. S. A.

Locomotives have improved vastly since those ambitious little wood burners struggled across the Union Pacific in the early 70's. The streamliner of today can do far more and do it much faster.



Never in history has progress been made more rapidly in precision gaging than in the last few years. Both standards of accuracy and gaging speed have made spectacular advances. The human equation, such an unpredictable factor just a few years ago, becomes much less troublesome.

Sheffield has its part in this march of gaging progress. It was Sheffield which produced the automatic gage illustrated—also the Electrigage, the Multichek Electrigage, the Precisionaire, the Thread Lead Checking instrument and others. If you are not familiar with what these instruments have accomplished in increased accuracy and faster inspection, write us for the story.

THE SHEFFIELD CORPORATION
Gage Division · DAYTON, OHIO, U.S.A.

SHEFFIELD MASTER GAGEMAKERS

been obtained. As was inevitable, every manufacturer in Canada and in the United States has been bringing pressure to bear, in the hope of speeding production and obtaining quick delivery. You hold the key to the productive output of war munitions from this continent, and your record to date is entirely creditable. I am confident that the output of munitions from this continent, as the months go by, will be a testimonial to the strength of your industry.

Subletting

The importance of adequate sources of supply of machine tools was recognized in Canada at the outbreak of war. A government-owned company was organized to obtain procurement of our machine tool requirements, under the Presidency of Mr. Thomas Arnold, who is also our Machine Tool Controller. Government purchases of machine tools, both for plants financed by the government, and for machine tools supplied by the government to privately-owned plants, have been made by this company. It has been the purpose that the Citadel Merchandising Company would anticipate machine tool requirements, and place orders for standard equipment in advance of requisitions, in order that delay in equipping our plants might be reduced to the minimum. It also has been the duty of this company to requisition machine tools from peace time plants, and to distribute war work to tools that could not be moved into war plants. Surveys have been made of Canada's machine tool capacity, and a "bits and pieces" programme has been organized, in an effort to make the fullest possible use of all tools in war production. Much has been accomplished in that direction. Machine shops of our mining industry, our newsprint industry, and, in fact, all machine shops built to serve peacetime industries, are now doing their share of war work. Centres have been established from coast to coast to search out machining capacity, and to provide war work for that capacity. We have tried to see that new tools are not requisitioned until all existing tools have been used. I am happy to say that any resistance from large contractors, to subletting work, is being broken down, and we are now

Attention---PLANT LAYOUT MEN!

With the present tremendous plant expansion programs under way, the item of machine space becomes ever more important. Plant and Tool Engineers are burning "the midnight oil" trying to work the required amount of machine tools into a given amount of floor space.

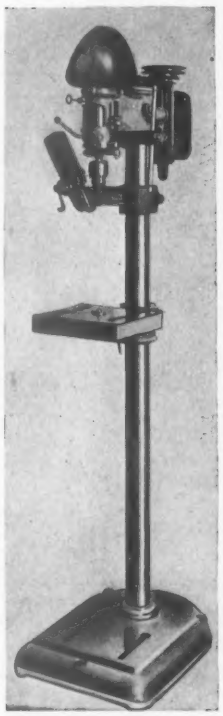
This is where the Dalzen line of Vertical Thread Grinders plays an important role—accuracy and production combined in a machine tool requiring little more than half the space formerly required for the production of ground threads.

These machines are furnished in two sizes. No. 1 Dalzen which will grind up to 6 inches diameter, 10-inch length threads anywhere on an 18-inch shaft. Dalzen No. 2 will grind a 3-inch diameter, 4 inches in length anywhere on an 8-inch shaft.

We also manufacture the Dalzen Combination Center Lapping Machine and Drill Press which saves the floor space formerly required for two separate machines.

This machine is 38 inches deep, 48 inches wide, and 75 inches high. Extreme operating floor space is 38 inches by 60 inches. Approximate shipping weight, 4400 lbs.

Machine is 39 inches deep, 43 inches wide, and 72 inches high, with extreme operating floor space 39 inches by 48 inches. Shipping weight is approximately 3200 lbs.



Can be changed over in a moment from Center Grinder to Drill Press or vice versa. You simply loosen one bolt and adjust the Center Grinder dresser in or out of position.

Write For Descriptive Literature

DALZEN TOOL & MFG. CO.

12255 E. 8 Mile Road **Detroit, Mich.**

receiving excellent co-operation toward making our "bits and pieces" programme a success.

Our whole economy has been, or is being, converted to the prosecution of the war, and more than 50 per cent of our national income is being used directly for war purposes. We are not only paying our own war costs, both in Canada and in Britain, through taxation and borrowing from our own people, but we are also financing all supplies and munitions furnished by this country for Great Britain. Our people are united in an all-out war effort, with a singleness of purpose that is the best possible proof of Canadian unity.

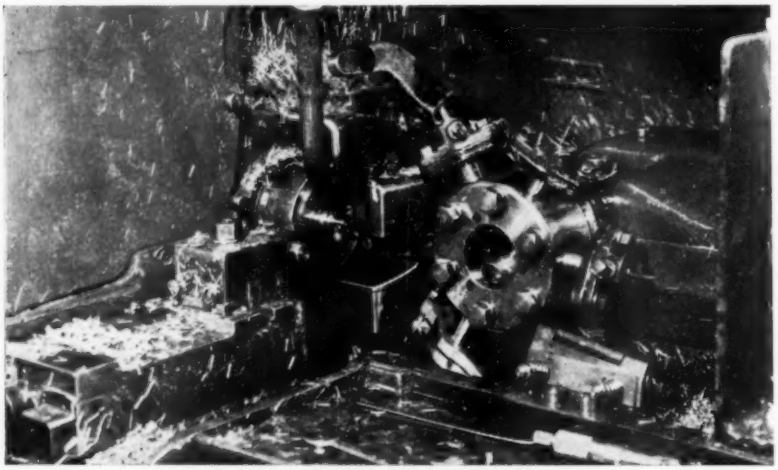
Canada is normally the world's greatest exporter of base metals, and our production of base metals has been speeded up enormously since the war began. We are not only supplying a very large proportion of Empire requirements for copper, zinc, lead, nickel and aluminum, but we are also an important supplier of these metals to the United States. In order that the maximum quantity of these metals may be exported for war purposes, their domestic use in Canada has been sharply rationed. Hydro Electric power is a prime requisite for this type of production, particularly for aluminum, and although Canada had large surpluses of power prior to the war, we are now undertaking several large new developments, one of 750,000 h.p. to be devoted to the production of aluminum in its entirety. It is worth while noting that all these metals are sold now for lower prices than those prevailing before the war.

We have made great strides in shipbuilding. Before the war, our shipyards were engaged chiefly in repair work, and total employment in the principal yards amounted to only about 1800 men. Today, 20,000 men are employed in our principal shipyards, and this will shortly be expanded to 30,000 men. In addition to a considerable programme of naval construction, we have undertaken a large programme of merchant shipbuilding. New berths have been added to existing shipyards, and facilities for the repair of ships on our Atlantic Coast have been vastly expanded.

We are today manufacturing in Canada practically every weapon used by the British in this war. We can now fully equip a division of troops in about five to six weeks. Only a small portion of our output is being used to equip our Canadian army, navy and air force, the great bulk of our production being for export to the theatres of war.

We are producing two types of medium tanks, one a standard British type medium infantry tank, and the other a standard United States type cruiser tank. Sources of armour plate have been developed in Canada, and our daily output of tanks is reaching substantial proportions. We are also turning out Universal Carriers in very large numbers. Since the outbreak of war, we have been shipping military vehicles to every theatre of war, and now have produced more than 200,000 of these vehicles. Our shell production has exceeded 7,000,000 units since the war began, and rate of production is steadily increasing. We are producing every part of the finished round of ammunition, including cartridge casings, fuses, primers and gaines. We are also producing bombs, depth charges, and contact mines in substantial quantity. Four large shell-filling plants have been completed and put in operation, with capacity to fill all shells and bombs made in Canada.

Our plants for manufacture of explosives, and the chemical components of explosives, include 26 separate projects, and have involved a capital cost of $126,000,000 to date. Canada's output of explosives is sufficient, not only to fill the shells and bombs produced in Canada, but provides large surpluses of explosives and chemicals for export to Britain.



Producing Shell Part in Canadian Plant
Seven million units since the war began.

Aircraft Industry

Just a word about our aircraft industry. This was almost non-existent at the outbreak of war, but today has grown to very respectable proportions. Today, Canada has an output of about 40 planes per week, about half of which are training planes and the balance fighting planes. We are producing 13 different types of planes, ranging all the way from small trainer planes to medium range bombers. Canada is now building all the planes required by our vast air training project, all the planes required for the defense of Canada, and, in addition, is manufacturing fighter planes and medium range bombers for the theatres of war. Several thousand planes are being used in our air training programme, and the overhaul and repair of these planes is in itself a sizeable industry.

One plant that will interest Tool Engineers is the John Inglis Company plant in Toronto, manufacturing Bren machine guns, Colt Browning machine guns, and Boys anti-tank rifles. I believe that this is the largest plant manufacturing machine guns in the world.

Of particular interest is the plant of Research Enterprises Limited, which is unique of its kind. This plant was built by the Government to manufacture secret radio detection devices, gun and bomb sights, and various types of secret weapons that have been developed by modern science. This plant also manufactures optical glass, being the second source of supply for that product on this Continent, and supplies all our war needs for op-

tical instruments. With Research Enterprises as a focal point, the electrical industries of Canada have been fully mobilized for war production. This plant works closely with our National Research laboratories, that have invented and developed many devices of the greatest possible importance to our war effort. In fact, the original purpose of Research Enterprises Limited was to manufacture the devices developed by our National Research laboratories.

Another plant is one that manufactures 25-pounder guns, complete from scrap metal to the finished product, including the gun carriages. So far as I know, it is unique, in that the gun steel, as well as the guns themselves, are manufactured in the same plant.

We are particularly fortunate in our labour relations. Our record in Canada for man hours lost through labour disputes is nearly as favorable as that of England, and much more favorable than that of any country except England of which we have record. Early in the war, we established a government standard of war wages, as being the highest wage paid in the industry over the past fifteen years, plus a cost of living bonus, uniform in amount, sufficient to compensate for increases in the cost of living as reflected in the average family. In general, labour has accepted this basic policy in good grace, and has cooperated in working out the details without loss of production time. There is little excuse for a strike in any Canadian plant under present conditions. Many of our industries can boast that not one hour has been lost as a result of a strike or lockout in any of its plants.

Complementary to U. S.

Canadian industry has always been complementary to, rather than a complete duplication of, that of the United States. It is still our policy to avoid manufacturers in Canada of items that can be produced more efficiently in the United States, where the demand is large enough to warrant mass production methods. We are dependent on the United States for motors for Canadian-built aircraft and Canadian-built medium tanks, and for a variety of other pieces of equipment that we have been accustomed to buy in that country. We have al-

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THREE
DOLLARS
FOR EVERY $1.00 YOU NOW EARN!

TIME... Labor! Those are two of the "bottlenecks" of production that most manufacturers are faced with these days!

In sanding... both of these bottlenecks can be broken with "Sandy", the Sterling Surfacer. Because (1) "Sandy" will do your sanding 3 TIMES FASTER, or (2) "Sandy" can do the same amount of sanding that THREE or your fastest hand-sanders can do! No wonder so many manufacturers have turned to "Sandy" to help them overcome these problems. A Sterling engineer will gladly help you on any sanding problems you may have. Write for more information TODAY!

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TOOL PRODUCTS CO.

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Please RUSH "Hints on Sanding Savings" to me at once!

Company.....

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City.....State.....

Attention of.....

ways imported about one-third of our steel requirements from United States, and, although we have greatly expanded our own steel production since the war began, we still depend on United States for about 2,000,000 tons of steel per year. Fortunately for Canada, the United States is most co-operative in meeting our requirements. It is recognized that the economy of the two neighboring countries is complementary, and should continue to be so, and that each country should avoid unnecessary duplication of the other's productive capacity.

No Lease-Lend

There is no lend-lease arrangement between Canada and the United States. We pay for our purchases in that country in dollars, and wish to continue to do so as long as we can obtain necessary United States dollars. Here again, the United States has been most co-operative, in purchasing from us raw materials and manufactured goods in quantity sufficient to enable us to pay our bills in that country.

You will find us a country with one definite objective in view—the winning of the war. We appreciate that up to this time all that we have done is avoid losing the war. We know that large armies of men and vast quantities of munitions will be required to enable the democracies to take the upper hand. The best efforts of your industry will be needed for many months, and perhaps several years, to bring our production up to the required level. We are not dismayed by the task before us, and we are not impatient with the situation as we see it today. The position of Britain and her allies is vastly stronger than when the war began, and is growing in strength month by month. We have no doubt of the final result, for we have some knowledge of the determination and fortitude of the British people. We in Canada are prepared to tighten our belts and take what the future will bring, confident in the power of a free people to triumph over the forces of destruction.

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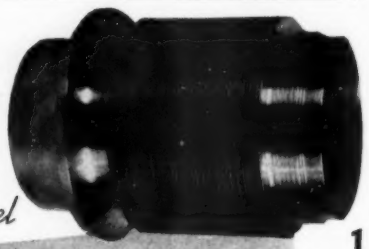
Thred Kut

PAT'D U. S. PATENT OFFICE

America's Unique Alloy Steel Cutting Oil



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This is one of its Outstandingly Successful Applications

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1. The finished cylinder barrel of a Wright Cyclone.

2. The cylinder barrel cut in two showing the depth and thickness of the cooling fins.

THE forty-six cooling fins on the cylinder barrel of a Wright Cyclone aircraft engine are cut in a single operation on a Fay automatic lathe. Using Stuart's THRED-KUT #99, these fins are cut cleanly to a depth of ⅝ in. and are only 0.022 in. thick. Seventeen pounds of metal are removed from this tough Nitralloy steel forging in twenty minutes.

• *When that TOUGH job comes along in YOUR plant —on ANY defense part—put Stuart's Thred-Kut and STUART OIL Engineering Application Service to work. Quit wishful thinking and GET the desired improvement quickly!*

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INDEPENDENT PNEUMATIC "AIRCRAFT" DRILLS

(Use Key F52 on post card on page 97)

"Aircraft" drills that are light in weight and develop a high power are announced by the Independent Pneumatic Tool Company, Chicago, Ill.

These ¼ inch—U14FS drills are particularly useful for operation in limited space or in unusually difficult positions. They have the power reserve and construction ruggedness necessary for high

"Aircraft" Drills

speed production, it is claimed. Of small size and compact design they are available in three different speeds and have side switch style handle for either continuous or intermittent drilling.

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"GREAT SUBSTITUTE" to Make Good in a HIGH SPEED FIELD!

In the Field of High Speed Steels Ingersoll D-B-L is Making Good

Many shops that formerly used only Hack Saw Blades made of "18-4-1" are today enthusiastic over the fine performance of...

Other Special Ingersoll Sheet Steels Include:

Alloy Steels
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Stainless Steels and
Saw Steels, including
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So satisfactory is this Tungsten-Molybdenum High Speed Steel as produced by Ingersoll, that its continued wide use is assured even after the present emergency is past.

The outstanding characteristics of Ingersoll D-B-L Steel for Hack Saw Blades are high impact resistance, tough cutting edge, relative freedom from decarburization, and a lower cost.

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A. S. T. E. DOINGS . . . . . .

By IRWIN F. HOLLAND

Baltimore

The Baltimore Chapter held another very interesting meeting on October 1 at the Sears Roebuck Auditorium. Forty members and guests attended dinner and 65 people were present for the lecture. Immediately following the dinner, Chapter Chairman, Godfrey F. Steiner, introduced the speaker of the evening, Mr. George Stevens of the Metallurgical Department of the Rustless Iron & Steel Corporation, Baltimore, Md.

Mr. Stevens very ably explained the composition and characteristics of the wide varieties of Rustless Alloys produced by his Company. An explanation of these alloys supplemented by a large chart which Mr. Stevens brought with him, indicated that his company produces stainless steels of a very wide range. Slides showing various types of cutting tools and their cutting angles as well as illustrations of typical operations on automatic machinery proved very interesting. Sample tool bits, box tools, taps, dies, and drills were presented for examination by the members. Many questions were answered by Mr. Stevens concerning the grinding of these tools.

The Baltimore Chapter is very fortunate in having Mr. Stevens as a member and sincerely thank him for his very interesting and educational talk. We are pleased to announced the enrollment of Mr. J. J. Hubbert and Mr. Joseph C. Pardi, of B. H. Hubbert & Son, Inc., Baltimore, Md., as members of the Baltimore Chapter. We are sure that they will find the Chapter members sociable and our meetings interesting and educational.

Surface finishing a "Wright" Master Rod with Jarvis Multispeed flexible shaft equipment
Radiing holes in a "Wright" steel crankcase

Boston

The monthly meeting of the Boston Chapter was held on October 9 at M.I.T. Sixty members and guests had dinner at the Smith House and about one hundred and fifty attended the meeting. The guest speaker, Mr. Mario Martinelli of the Cincinnati Milling Machine Co. was introduced by their Chairman, C. A. Lockwood. Mr. Martinelli's talk on the Science of Metal Cutting was supplemented by a technicolor film. The use of carbon techrachloride as a means of reducing adhesion and effects of temperature on type of chip formed created much interest. Dudley W. Rockwell, Chairman of Entertainment Committee expects a big turn out for the fall dance to be held November 14 at Hotel Lenox, Boston. Members of other Chapters are invited.

Chicago

The Chicago Chapter had much better weather for its golf tournament on September 20th than it did for the October meeting on October 6. The golf tournament at the Midwest Golf club was quite well attended in view of the number of members who were working. Forty-nine played golf; the scores were much better than expected, even by the players, as a dozen, shot themselves out

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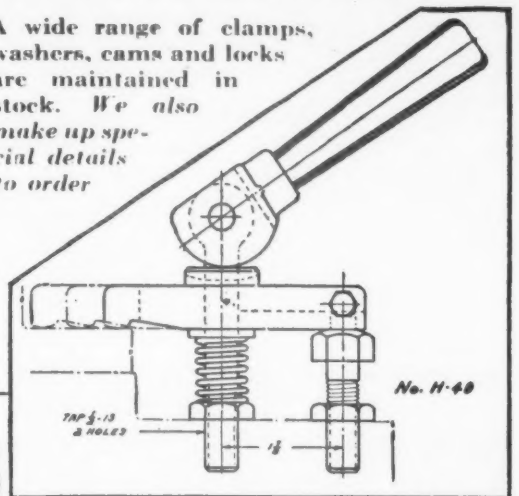
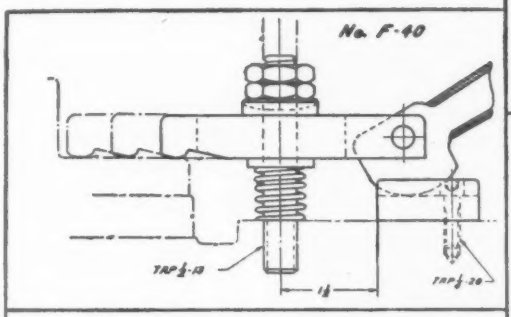
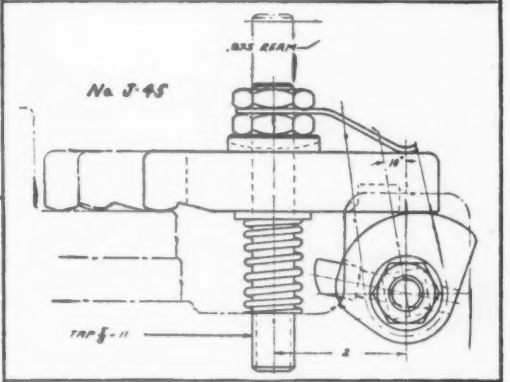


Clamp Assemblies

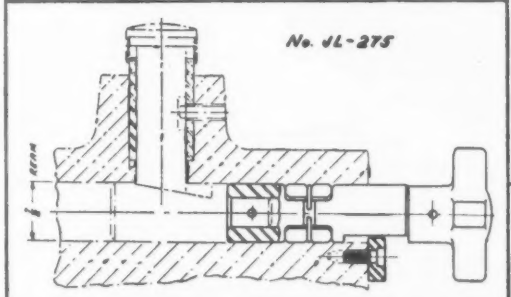
H-40
J-45
L-60
C-40
F-40
M-15





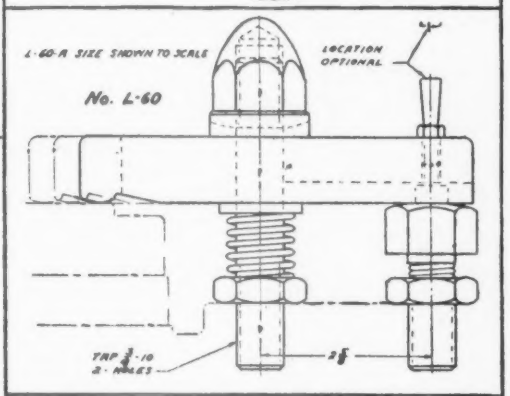
Jack Lock

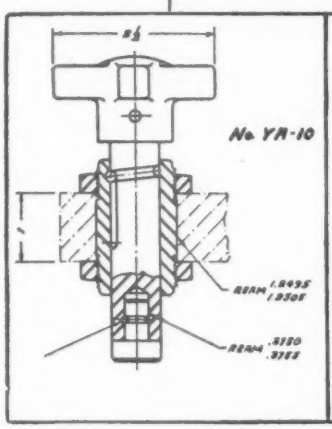
JL-275

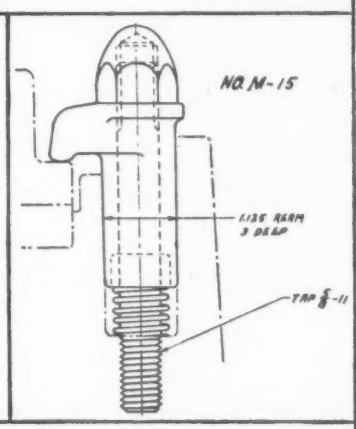


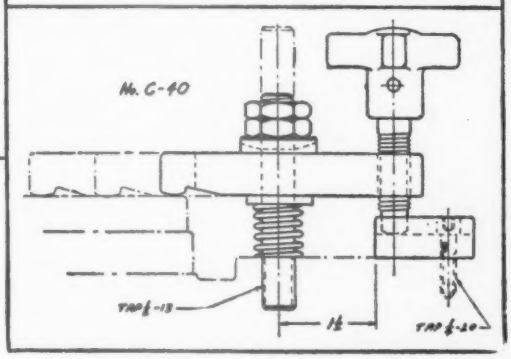
Cam Long Lock Travel Clamp

YA-10









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of the bottom of the blind bogey. Three shot in the 70 gross bracket: Polhemus 73, F. Bonton 74, and F. H. Mergz 77, and the 80's and 90's got most of the rest. Sixty-three were present for the dinner. A good meal, very brief speeches, and the presentation of a large assortment of prizes finished a pleasant day.

The October meeting, at the Midwest Athletic Club, was different. About eighty members turned out in spite of very bad weather to hear and see some of the latest dope on airplane sheet metal work. Mr. Louis Biehler gave his fellow members an interesting talk, illustrated by slides, on "Multiple Sheet Profiling and Forming by Rubber." A motion picture, showing the use of equipment designed for wood but converted to metal working for the airplane industry was presented by a representative of the Onsrud Company.

Dayton

"President's Night" was a huge success for the Dayton Chapter. The meeting was held in the Hotel Gibbons Ball Room on October 13 with over 100 members present. Our genial Chairman, "Whitey" Poock, acted as toast master and was assisted by Past Chairman Earl Johnson who introduced Frank Curtis and Past Chairman George Goodwin who closed the meeting. Mr. Curtis' talk, illustrated by slides, was well received.

Everyone seemed to enjoy the meeting with the possible exception of Ed Johnston who had a little difficulty with about ten inches of turkey neck.

The Dayton Chapter was also invited to join with the Cincinnati Chapter on October 14 in visiting the new plant of the Wright Aeronautical Corporation at Lockland, Ohio. About 100 members journeyed from Dayton and found the trip well worth while. The Dayton Chapter wishes to again thank the officers of the Cincinnati Chapter for including the Dayton group in this meeting.

Grand Rapids

The Western Michigan Chapter held its meeting on October 13 at the Occidental Hotel in Muskegon, Michigan. The meeting, a supper meeting, was attended by 70 members and their guests. All engineering business was postponed until the next meeting. This was necessary due to the length of time required to properly express the subject of the lecture. The lecture was presented by Mr. H. A. Frommelt of Kearney & Trecker Corporation. His subject — "Milling Machines as Applied to the Production of Plastics in Defense". He opened the lecture by showing a movie of the different uses of plastics and the part milling machine played in the manufacturing of plastic molds. Following the movie, he continued his lecture with slides showing the development of plastics, their molds and the equipment necessary for manufacturing plastic products. All agreed the lecture was a great success and invited Mr. Frommelt to return again in the near future.

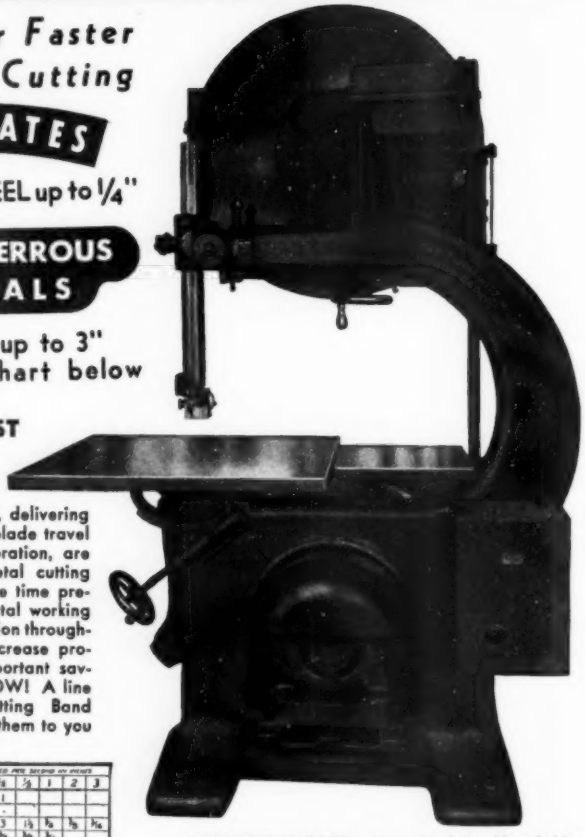
Hamilton

The opening meeting of the Hamilton District Chapter was held at the Royal Connaught Hotel in Hamilton on Thursday, October 9. Following the dinner, Chairman Dawson called the meeting to order and disposed of the accumulated business. Messrs. Arnold Thompson, Len. Singer, and Eric Crawford from Toronto Chapter were guests, and gave a short resume of the preparations now completed for the semi-annual Convention. After a brief period of entertainment, provided by the Entertainment Committee, Vice Chairman Little introduced the speaker of the evening, Mr. H. A. Frommelt, Director of Technical Research for the Kearney & Trecker

TANNEWITZ HIGH SPEED METAL CUTTING BAND SAWS

. . . a far Faster Means of Cutting TEMPLATES from SHEET STEEL up to 1/4"

NON-FERROUS MATERIALS of all kinds up to 3" thick — see chart below



SAVE THEIR COST IN SHORT ORDER

These superb machines, delivering over two miles of saw blade travel per minute without vibration, are doing hundreds of metal cutting jobs in a fraction of the time previously required, in metal working plants of every description throughout the country. To increase production and make important savings get the details NOW! A line requesting Metal Cutting Band Saw Bulletin will bring them to you promptly.

KIND OF MATERIAL	Thicknesses and feed per second in inches							
	1/32	1/16	1/8	1/4	1/2	1	2	3
Mild Steel	32-24	6	3	1				
Stainless Steel	6	2	1	-				
Yellow Brass, Zinc	24	12	6	3	1½	¾	⅜	3/16
Bronze or Copper	6	3	1½	¾	⅜	3/16		
Aluminum	24-36	18	9	4½	2	1½	1	¾
Duraluminum	24	12	6	3	1½	1	¾	½
Sheble Plymetal				6	4			
Double Plymetal				4	3			
Plywood	24-36	24	20	16	12	6	3	1½
Asbestos Board	12	6	3	1½	¾			
Fibre (Hard)	24	12	6	¾				
Paper Board	24	18	12	4	2	½		
Masonite	24	18	12	6	3	1½	¾	⅜
Bakelite	12	6	3	1½	¾	⅜	3/16	

PERFECTLY SAFE: Two-wheel Lockhead Hydraulic Brakes automatically and instantly stop the wheels in case of saw blade breakage—completely guarded.

Incorporated in Tannewitz High Speed Band Saws are many highly developed, patented features found in no other band saws.

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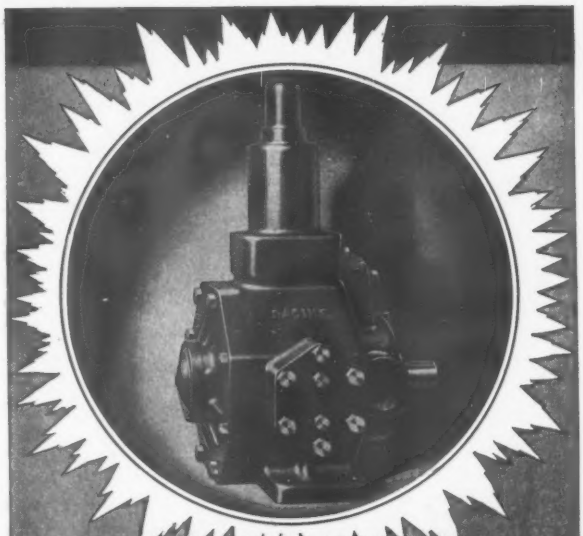

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Carbon	.75%
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Tungsten	1.50%
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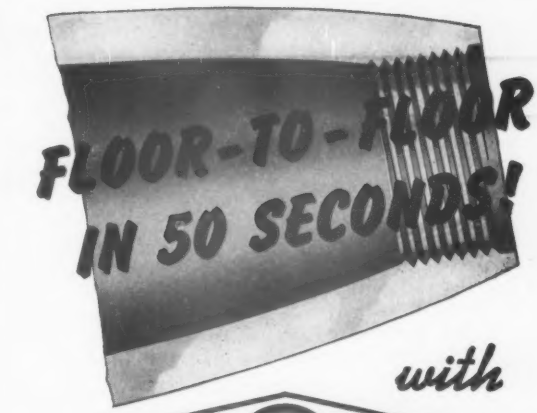

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● **Time is of the essence in defense production. Plan-O-Mill is the fast economical way to combine thread milling with spot-facing or chamfering which must be concentric with the threaded hole.**

To take a typical operation:

MATERIAL:	**155 mm. steel, H.E. projectile.**
OPERATION:	**1. Mill 2" diameter thread, 14-threads per inch.** **2. Finish face concentric with thread.**
TIME:	**50 seconds, floor to floor with Plan-O-Mill.**

● **Wherever accuracy and high finish must be combined with volume production and low cost Plan-O-Mill thread and form milling machines are indicated. Particulars will be gladly supplied; deliveries promptly made.**

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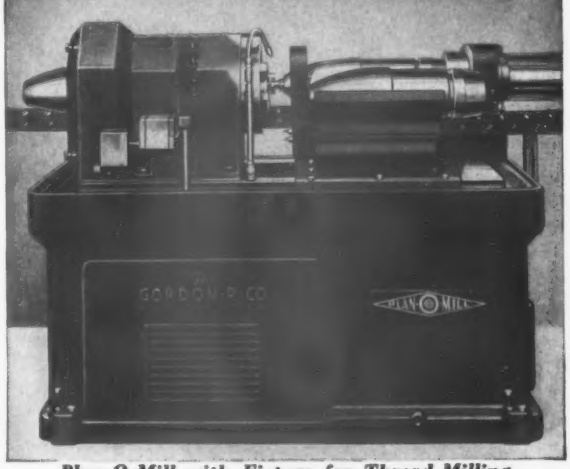

Plan-O-Mill with Fixture for Thread-Milling Aircraft Engine Cylinder Heads.

Corporation, Milwaukee, Wisconsin. Mr. Frommelt gave a most interesting and instructive talk on plastics, with particular reference to their place in connection with National Defense, rounding out an evening which will be remembered for some time by those members and visitors who were present.

Hartford

The first regular meeting of the Hartford Chapter for the 1941-42 season started, as is the custom, with a good dinner at 6:15 at the City Club. At the speaker's table were the speakers of the evening, Mr. Richard F. V. Standard of Hartford Chapter, and Mr. Arthur Conrad, Defense Administrator of the Hillyer Junior College, besides the local chapter officers. Also in attendance at the dinner were several members of the Springfield Chapter, among which was a large delegation from the Van Norman Machine Tool Corporation. Every one appeared in high spirits as jovial banter was passed from table to table. Henry Moore, Hartford Chapter Chairman, called the dinner to a close for all to gather at the place for the meeting. The technical meeting convened at the Gas Company Auditorium at 8:00 with a good crowd of members and guests present. Reports were called for from several of the committee chairmen, and proved to be very interesting. Carl Moeller enlivened the treasurer's report with a very good analysis of the cost of operation of the chapter. His report showed the actual cost of operation broken down on a cost per-member-per meeting basis. This was a new wrinkle for this report and made a very favorable comment come from all present. The report of the educational committee showed the tremendous amount of time and work that this committee under Ed. Morancey has put into getting the new program going in cooperation with Hillyer Junior College. Mr. Conrad of Hillyer gave a short talk on the selection and placing of men in the course. "Upgrading" of men from local plants toward the goal of producing more and better trained Tool Engineers was stresed. It was stressed that the course at present must be of a short nature without too much preliminary training, as the national situation will not allow a long range program. George Highberg gave an analysis of the Chapter's standing on membership and read off the names of ten new applicants for membership. His committee has shown very excellent results.

The topic of the meeting as "Basic Considerations for Contracting Defense Machine Tools" and a very fine address on the subject was given by Mr. Stanton. He was introduced by Harry Hauck, Chapter Secretary, in the absence of Bill Fenn due to illness. Bill had been scheduled as meeting chairman but his doctor would not allow him to show up. The address of the evening covered the whole proposition of subcontracting as followed by the Pratt & Whitney Division of the Niles-Bement-Pond Company. It started with the need for all the speed and the need for this sub-contracting. Germany's program was outlined showing how machine tool production for armament had been increased over a period of years, and how the experience and training of this expansion had placed a much greater burden far ahead of anything previous, on the manufacturers of this country. He emphasized the importance of careful selection of contractors. This covered the personnel of the company, equipment available, type of work to which it was best adapted, understandings between parent company and contractor, specifications, quotations in exact quantity, definite production schedules, parts and gauges to be furnished, and promptness of shipment after inspection. A more comprehensive idea

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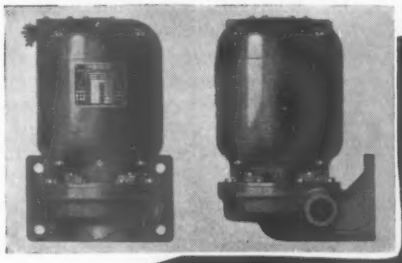

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The modern streamlining of the motor is enhanced by the absence of inlet piping in the pump.

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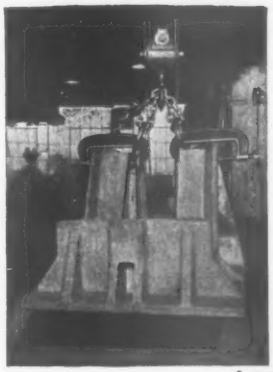

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Here is dependable quality that you too can rely on. Look for the Arm-and-Hammer Trade Mark. It guarantees a better clamp. ***Write for Catalog C-39***

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of the talk will be obtained from a paper to be published in the Tool Engineer by this speaker soon. It will suffice to say here that he was the complete master of his subject. He showed definite and complete understanding of every phase of the sub-contracting field as could be gained only through much endeavor along this line.

A question period followed the address in which several general questions were raised and answered. The meeting adjourned with a rising vote of thanks for a good job well done.

Indianapolis

The Indianapolis Chapter of A.S.T.E. held its first fall meeting on September 25 at the Indianapolis Athletic Club. The meeting was attended by approximately 55 members and guests. The meeting was smaller than last year's average, due largely to the priorities of defense work. Ronald Updike, Chapter Chairman, conducted the meeting and introduced Mr. E. L. Hemingway, Chief Metallurgist of the Foster Machine Company Division of the International Machine Tool Corporation.

Mr. Hemingway spoke on the history, theory and technique of "Superfinishing", dealing with the subject in an exceedingly interesting manner. After the talk, color pictures were presented showing various standard and special purpose "superfinishing" machines in action.

Greater New York

Chapter 34 began the fall season with the largest meeting in its brief history. Four hundred and thirty-five Tool Engineers and their friends attended the stag banquet on September 15 in the Grand Ball room of the Hotel New Yorker, scene of the 1940 annual national meeting in New York City. Tom Orchard and Cort Rhodes had laid their plans well and the result was a gala affair of such proportions that it surprised the chapter itself and National Vice President Ray Morris said, "I am completely surprised and speechless at the tremendous growth and fine spirit shown . . . . "

The head table, at which were seated some thirty-five guests and officers, stretched along the entire length of the main ballroom. Among the guests of honor were: General Frank P. Lahm, Air Officer, 1st Army Headquarters, Governor's Island, New York; Major William J. McKiernan, Air Corps Factory Representative, in charge of Aircraft Inspection in Northern New Jersey; Newbold Morris, President, New York City Council; William Littlewood, Vice President of Engineering, American Airlines; P. B. Taylor, Vice President and Assistant General Manager, Wright Aeronautical Corporation, Paterson, N. J.; F. D. Jones, The Industrial Press, New York City; Phillip M. McCullough, Eastern District Manager, Division of Priorities, O.P.M.; Major Reilly, Air Corps Procurement Office, New York, N.Y.; Frank Curtis, National President, A.S.T.E.; and Ray Morris, National Vice President, A. S. T. E.

With a flair for the dramatic, the hotel topped off a grand dinner by sending in the waiters with the dessert course mounted on the top of illuminated boxes which, when lined up in front of the diners, spelled out "Keep 'Em Flying" in the darkened ballroom.

National President Frank Curtis congratulated the chapter on its rapid growth and fine spirit and emphasized the vital importance of the defense work being accomplished by all Tool Engineers. He stated that the rate of machine tool production was fast approaching the 1 billion a year mark. The present tool program, he said, will require about one billion man-hours per month for the next twenty-four months.

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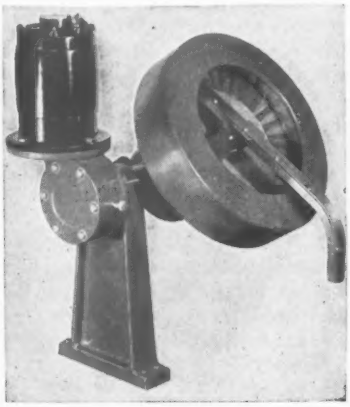

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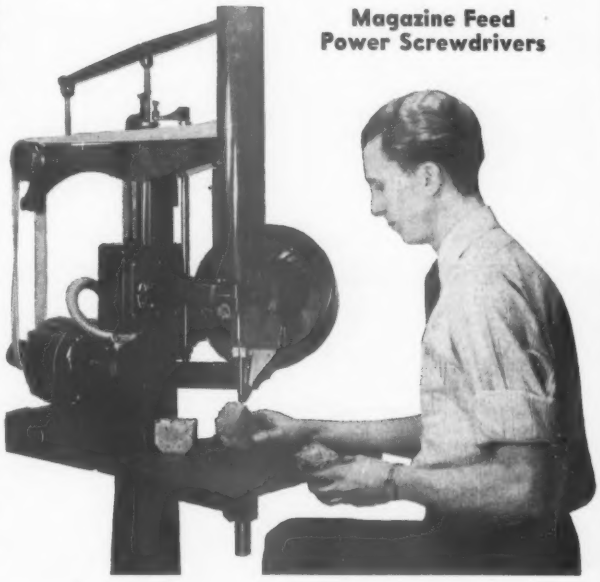

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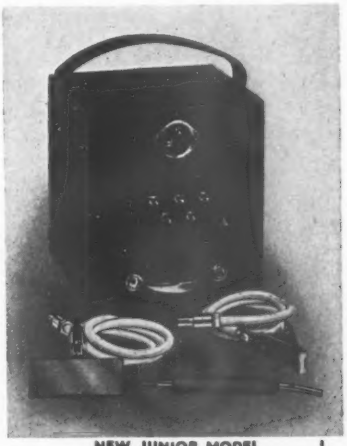

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Vice President Ray Morris proved that he wasn't completely speechless by delivering a stimulating talk to the membership in which he called for an even greater effort in behalf of the Society and a large delegation from New York to attend the fall meeting in Toronto.

The after-dinner speaker, Mr. Phillip McCullough, delivered a timely address on the subject of priorities. He pointed out that the reason for establishing priorities was the need for an increasing part of national production to be diverted from non-defense to defense channels, with the least possible obstruction and delay. He stated that about 17 to 20 per cent of the national economic effort was being utilized in defense work, but pointed out that 50 per cent of Great Britain's and an estimated 55 per cent of Germany's annual national income were being diverted to war effort. He also brought out the fact that although only $15,000,000,000 of the $60,000,000,000 had been spent to date by the United States for defense, that by February 1942 the rate of defense expenditures was expected to reach $3,000,000,000 a month.

An added attraction of the evening was a drawing for a large number of unusually fine door prizes which had been donated by friends of the chapter. A special prize consisting of a large radio-television set was raffled off and this was won by Mr. Charles Winchell of the Wright Aeronautical Corporation.

The technical session was under the auspices of the E. W. Bliss Co. and Mr. G. L. Oliver, president, acted as honorary chairman during this part of the program. A most interesting and instructive talk on the subject of die and press design, including a discussion of the plastic flow theory and strain hardening of metal was delivered by Mr. W. M. Evarts of the E. W. Bliss Co. and was accompanied by slides and motion pictures.

This first stag dinner meeting ended well after midnight with the announced promise literally fulfilled: "Something doing every minute". It will undoubtedly become an annual event.

The second meeting of the season was held on October 6 at the Hotel New Yorker. Midsummer peak temperatures and high humidity sent many October acclimated New Yorkers limping homeward after work. Some Tool Engineers ducked home too, but those who came to the meeting were rewarded by a comfortable evening in the air-conditioned North Ballroom with much interesting information painlessly absorbed. Mr. William H. Oldacre, president and general manager of the D. A. Stuart Oil Co., Ltd., Chicago, Ill., spoke on "Lubrication of Machine Tools, Cutting Tools and Lubricants".

Said Mr. Oldacre, "The Tool Engineer and designer should be the first to recognize the adaptability and usefulness of the lubricants made possible by these developments. Lubrication should never be an afterthought. It is as much a part of basic engineering and design as are materials and dimensions. It is not stretching our imagination when we suggest that lubricant specifications should appear on the original blueprints".

A subsequent discussion period clarified some of the difficulties and problems which were brought up by members of the audience.

Peoria

Mr. Erik Oberg was the principal speaker at the October meeting of the Peoria Chapter held October 7 in the Creve Coeur Club. Ninety people turned out to hear him talk on the subject: "Voluntary Economic Methods versus Compulsory Economic Systems."

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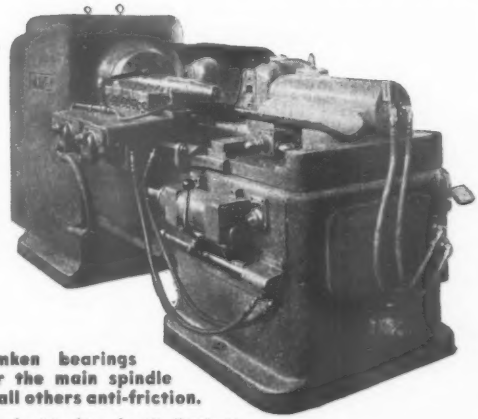

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In his talk, Mr. Oberg pointed out that the so-called Capitalistic System is not a "system" at all but a voluntary method, there being nothing in the economic conception of this country to prevent a sufficiently large group of people from owning their own enterprise if they should so desire.

On the other hand, under the compulsory economic systems, everyone must do exactly what he is required to do economically.

There is nothing voluntary in the system. Mr. Oberg was pleasantly surprised while in Peoria when an acquaintance of his whom he met in London and on board ship crossing the Atlantic came to the meeting. This acquaintance, Mr. Herman Jacks, was a German refugee who now lives in Peoria but who first met Mr. Oberg on an Atlantic Ocean Liner on his first trip to America and later met him in London when he was leaving Germany for good, with his wife and belongings. At that time, because he had not been permitted to take but $4 out of Germany, he was in bad financial straits; so Mr. Oberg gave him enough money to help him out. Mr. Jacks came to the meeting to renew this remarkable acquaintanceship.

Preceding Mr. Oberg's talk were two short talks on "Model Railroading" by two members of the Society of Model Engineers, Mr. Paul W. Zickgraph, National President, and Mr. Fritz, Chairman of the Peoria Chapter. Their talks were accompanied by a model exhibit.

The meeting closed with a film: "The All American Way", which was secured from the Chicago Tribune.

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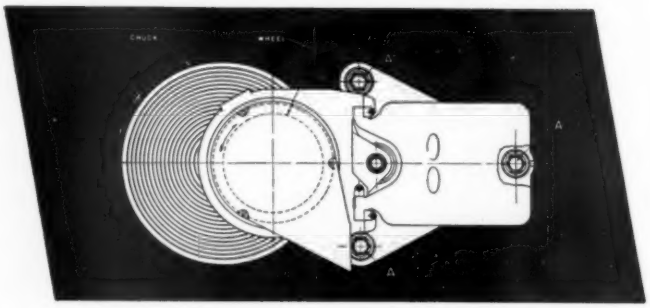

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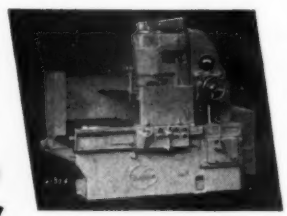


No. 18 Blanchard Surface Grinder

Philadelphia

The regular monthly meeting of the A.S.T.E. was held on Thursday, September 18, 1941, at the Engineers' Club of Philadelphia. At 6:30 p.m. dinner was served to 158 members and guests. At 8:45 Mr. McMonagle, Chairman, called the meeting to order and turned over the introduction of the guests and speakers to the Vice-Chairman, Mr. Charles Crook.

Brig. Gen. Lewis B. Hershey, United States Director of Selective Service, was the first speaker introduced, and he gave a very instructive talk.

The chair was next taken by Dr. William Mather Lewis, Pennsylvania Director of Selective Service, who also gave a talk covering the Selective Service.

The meeting was then taken over by Lt. Col. John McI. Smith, Head of the Legal Department at Harrisburg on Selective Service. He called for questions which, in turn, were answered by Major Beasley, covering the various problems confronting members at the meeting. At 9:00 the meeting was turned back to the Chairman, Mr. McMonagle, who heard various reports from the different committees.

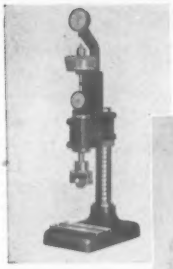
At 10:00 the meeting was closed and the floor was turned over to Mr. Christophersen, who was in charge of the entertainment. A very good show was put on and the meeting adjourned at 11:15 P. M.

Pittsburgh

The October meeting of the Pittsburgh Chapter was held at the Research Laboratories of the Gulf Oil Corporation, Harmarville, Pa., on Friday evening, October 3.

Ninety-six men sat down to the dinner and several more came in afterwards to hear the speaker of the evening, Mr. W. H. Wills of the Allegheny-Ludlum Steel Corporation from Dunkirk, N. Y., speak on tool steels. The topic was very interesting and timely in view of present conditions affecting tool steels.

To liven up the discussion period following the talk, our Chairman, Bob Ford, appointed a board of four experts



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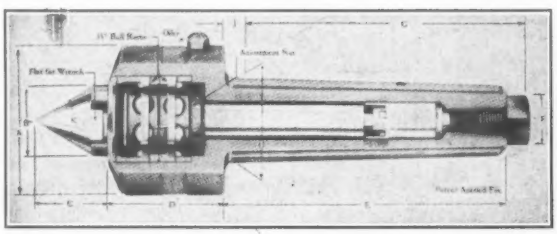

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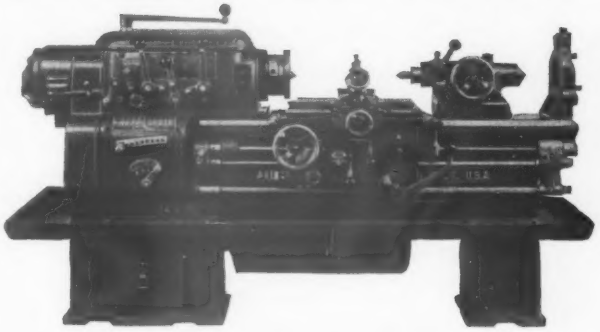

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from the audience to aid Mr. Wills in answering questions. This information board consisted of Mr. J. R. Rose and Mr. Norman I. Stotz of Universal-Cyclops Steel Corporation, Mr. Leonard Grimshaw of Latrobe Electric Steel Company, and Mr. J. A. Nelson of Braeburn Alloy Steel Corporation. They aided materially in clearing up and adding new points of view to the various questions that were asked.

At the conclusion of the meeting a rising vote of thanks was given Mr. Wills for his very able paper.

Rochester

The Rochester Chapter held their October meeting in the University of Rochester Strong Auditorium on October 8. The speaker, Lloyd Marshall, used a novel method to illustrate successful tooling. He represented a "tool" as a 4-wheel wagon in his address before the Rochester Chapter. Mr. Marshall, metallurgist of the Rochester plant of Delco Appliance Division, General Motors Corporation, stressed that the tool must be properly designed (as one wheel), it must be properly machined (as another wheel), also of the proper material (as a third wheel), and last but not least, properly heat treated (as the fourth wheel). Using his 4-wheel wagon illustration he said that a 100% effective tool could be possible only when 4-wheels were true and round. A design error or hardening error was illustrated by flat spots on their respective wheels, thereby impairing smooth operation of the completed tool. The other two essentials were likewise illustrated.

Mr. Marshall further emphasized the close relationship particularly at this time betwen the Tool Engineer and the metallurgical department as very important. With tool steel substitutions a necessity today, both the hardening and designing departments materially aid each other by putting their heads together and pointing out their respective limitations. This cooperation is bound to work to their mutual advantage according to the speaker.

A very interesting chart was drawn on the blackboard by Mr. Marshall for the purpose of aiding in the selection of proper steels. Altho only a few examples of the steel type were illustrated, he did show how the Tool Engineer could be helped when he had to choose a steel for the job. This "selection chart" had five values listed which were 1) material cost; 2) labor cost; 3) production expectancy; 4) manufacturing hazards; and 5) the distortion factor. Altho the speaker did not attempt to cover any wide range of available steels, he did include for explanation purposes three types of oil hardening steels as well as the same number of water hardening types. As example of how he used this chart such as where a question of material cost vs. production expectation as illustrated where low production was required as against where long runs were desired.

The open discussion which followed was very lively, and we are sorry that space will not permit a detailed report of this interesting part of the session.

Mr. Marshall handled his subject in a very interesting way, and he is definitely a potential speaker for some of the neighboring Chapters.

Rockford

The regularly monthly meeting of Chapter 12 of Rockford, Illinois, was held at the Faust Hotel on October 9th. The excellent dinner was enjoyed by the 125 guests and members during which entertainment consisted of a number of selections played on the Concert Grand piano and Solovox Combination. Announcements were made by Fred J. Kempmeier, co-chairman of the chapter, followed by a recess.

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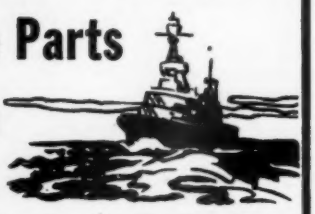

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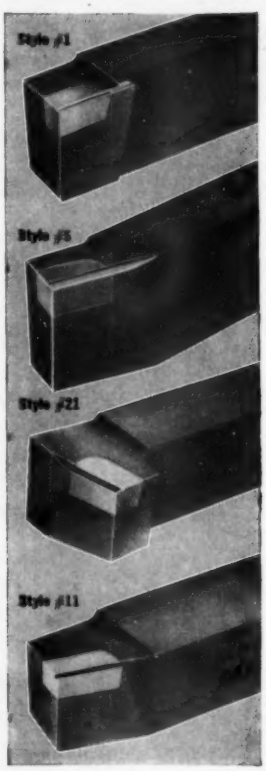

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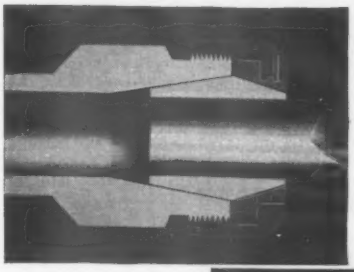

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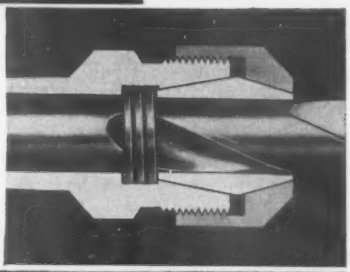

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Erik Oberg took the floor for the address of the evening. Mr. Oberg is a return speaker at Chapter 12 and gave his 300 listeners another of his grand talks, this time on the subject, "Voluntary Economic Methods versus Compulsory Economic Systems". The discussion was well received, so much so in fact, that the crowd seemed reluctant to leave after the speech.

Schenectady

On October 9th approximately one hundred members and guests of Chapter 20 gathered at the Schenectady Municipal Golf Club for a chicken dinner and monthly meeting of the Society.

Following a short business meeting, Chapter Chairman Al Schuneman introduced Mr. C. R. Staub, Chief Engineer of the Michigan Tool Company, who gave an illustrated lecture on "Gear Shaving and Gear Lapping." Mr. Staub pointed out that present day gear applications require maintenance of very close tolerances and to which this type of gear finishing has definite advantages. He also called attention to the fact that savings both in material and labor may be obtained because any error in machining or hardening is corrected in the lapping or shaving operation and further results in a gear of greater accuracy and longer life. Mr. Staub brought up many interesting illustrations of the use of this process in aircraft, automotive and electrical industries manufacturing equipment for National Defense. Following the talk many questions were asked by the group and interestingly answered.

South Bend

The regular monthly meeting of the South Bend Chapter No. 30 was held at the Indiana Club on Tuesday evening, Oct. 14th with Horace Wentzell, chairman, presiding. There was a very excellent attendance at both the dinner and the technical session afterwards. Following the dinner Glave Bunch Jr. and Frank Foote showed two interesting motion pictures called "Scenic America" and "Highlights of the 1940-41 News." The technical talk was given by Mr. B. Williams of the Heald Machine Co., Worcester, Massachusetts. His subject was "Precision Borizing and Precision Finishing of Surfaces", very interesting and illustrated with numerous slides.

Our current membership is 181. Last year we were proud of 128. We have a fine chapter in South Bend and will welcome all visiting members and their guests.

Springfield

The Springfield Chapter, Springfield, Mass, held its October Meeting on the 13th. Mr. T. O. Armstrong, Personnel Director of the Westinghouse Mfg. Company, gave a very interesting coffee talk on "Human Relations and Production." He pointed out the need for Human relations in all our defense effort and that it was not one man's job to be a personnel director but every man in any executive capacity whatsoever. He also pointed out that the Tool Engineer had a selling job on his hands every time he made a change or improvement as people all resent change.

For the technical session, Mr. H. M. Richardson, Chief Engineer of the Plastics Department of the General Electric Company, who was well received, gave a very interesting talk on all the new developments in plastics. He had a large display of articles made from the different grades of material and explained why certain materials were used for different articles. A lively discussion followed Mr. Richardson's talk, which brought out many questions that were valuable to us all.

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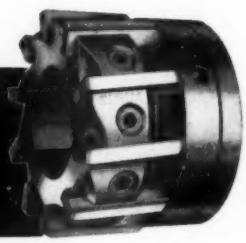

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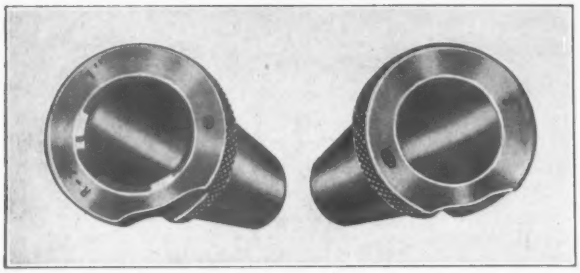

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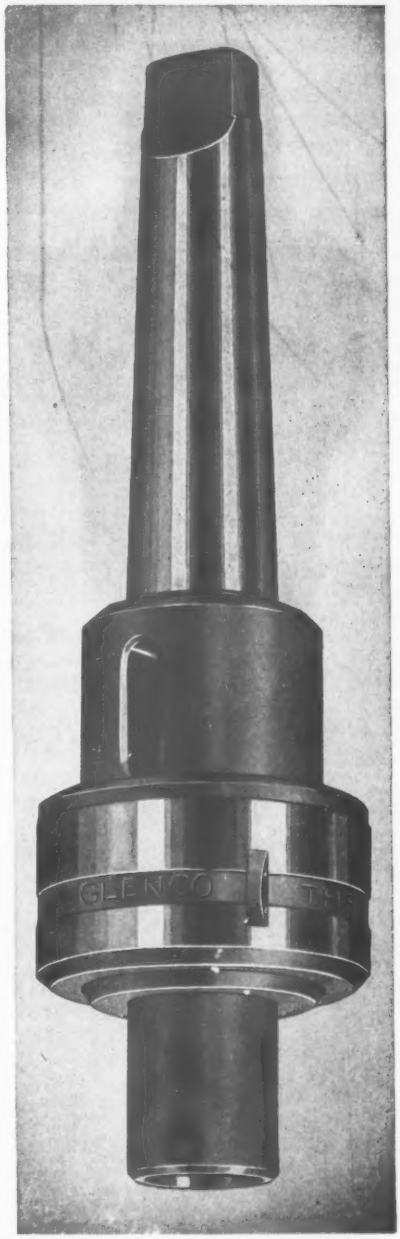

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Toronto

Sandwiched among the preparations for the semi-annual meeting, the Toronto Chapter held a very successful meeting on October 10th. The speaker was H. A. Frommelt, Director of Technical Research, Kearney and Trecker Corporation, Milwaukee. The subject "Plastics in National Defense", was devoted chiefly to emphasizing the importance of plastics as an engineering material, and to deploring the degree to which it had been neglected in view of its excellent strength-weight characteristics. The meeting was attended by about 125, and in the absence of Chairman E. Barker, E. N. Wearn, vice-chairman, presided.

Twin States—Springfield, Vt.

Following a fine baked ham dinner at the Masonic Temple on Wednesday, October 8, President Wilbur Handy presented Mr. Walter Breeler, Assistant to the President of the Allegheny-Ludlum Steel Company. Mr. Breeler gave a fascinating talk before eighty-three members and guests on the subject of Molybdenum High Speed Steels. With the aid of slides he outlined representative heat treating processes and the hardnesses resulting. He emphasized the fact that Moly High Speed Steels are interchangeable with the common 18% tungsten High Speed Steel—18-4-1. He further pointed out that these steels have less weight per unit of volume, which, together with a lower base cost rate, materially reduces the cost of tools. Mr. Breeler detailed significant application for these tools today. The Chapter members who are daily concerned with heat treating problems welcomed his lucid responses to their many questions at the conclusion of his talk. An added feature was the showing of four reels of sound pictures depicting cutting tool applications for lathe work which were loaned by the University of New Hampshire and presented by Mr. Carleton Gosselin of Springfield. The illustrative drawings incorporated in the pictures amplified our understanding of the functions of these tools.

Attention was directed to the Toronto meeting of the A.S.T.E.

St. Louis

With Fall activities of this Chapter now rolling smoothly along, a large number of members attended the regular monthly dinner meeting at the Melbourne Hotel, on October 9. With Chairman Burnside indisposed, Vice Chairman, Charley Sinning stepped into the breach and took over control. There was much discussion about the semi-annual meeting at Toronto, and it looked as if the Chapter would be well represented.

After the business session, Vice Chairman Sinning introduced the speaker of the evening, Mr. B. P. Schiltz of the Foote-Burt Company. The subject of his talk was "Surface Broaching" and it was illustrated with slides. The lecture was most interesting and was keenly appreciated by all those present. The meeting was over in time to allow the members to hit the hay at 10 p.m. if they so desired. We wonder how many did?

Worcester

The Worcester Chapter held its meeting on October 8. This meeting was well attended and those present were well repaid for the time given. They were all pleased to see Mr. Silas T. Massey of the Heald Machine Company and Mr. Herb Griffing of the Norton Company and hope that they may have occasion to visit them again. The customary short business meeting was held and during this meeting Mr. Bob Lippard

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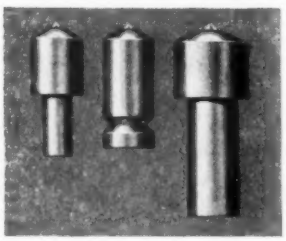

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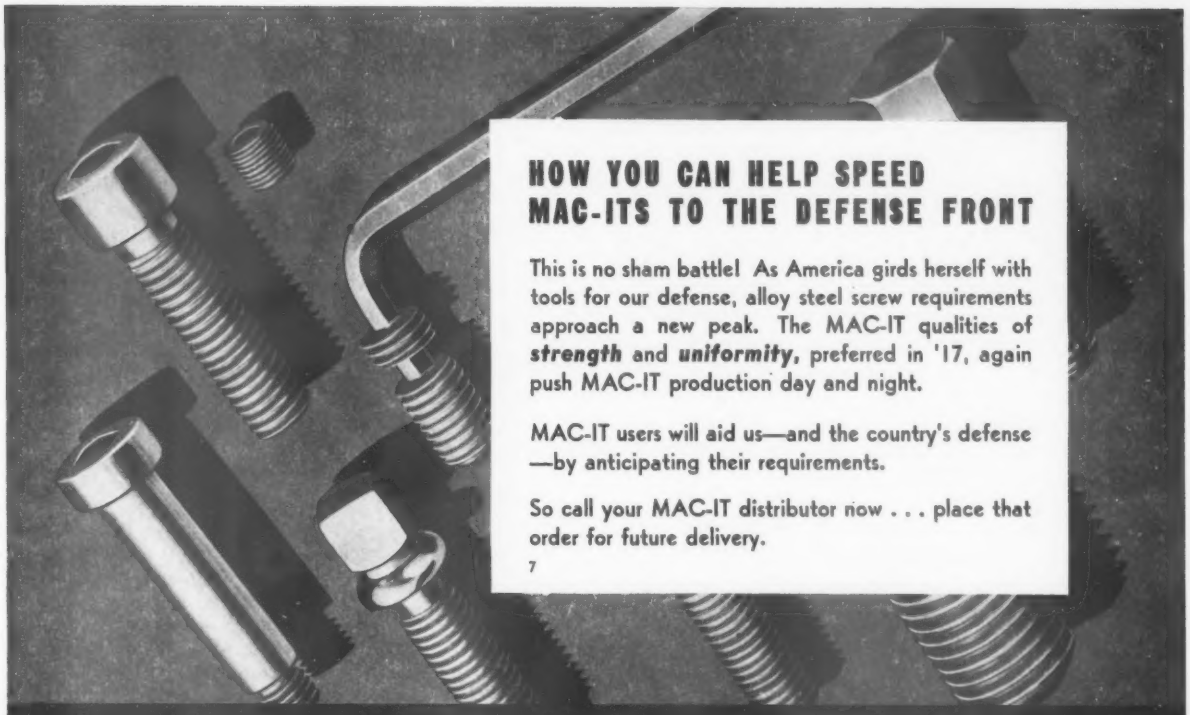

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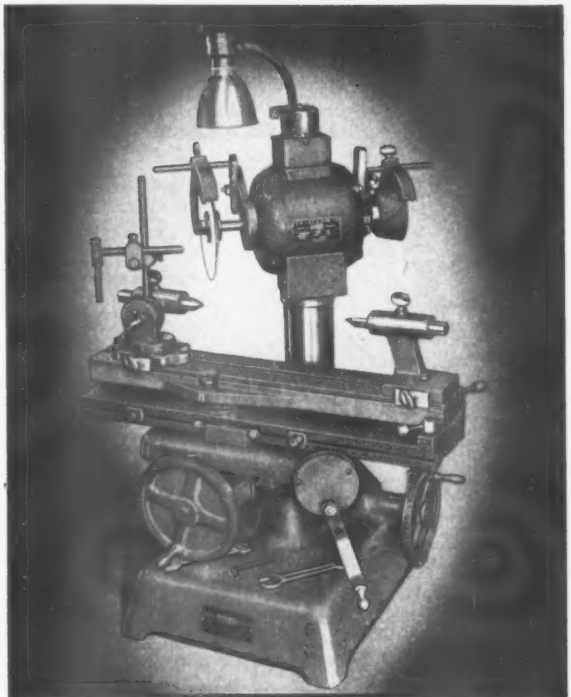

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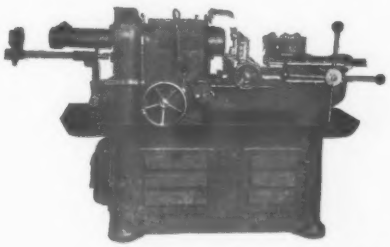

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Any spindle speed you want—a direct reading dial shows when you've got it.

Permits the use of carbide tools for fast cutting.

Turret clamps and unclamps automatically.

Equally effective on second operation and chucking work.

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ran through the high points of what one may expect to see and hear at the coming Toronto meeting. The Chairman, Mr. Lindegren, announced that up to date there were about 12 Worcester members who had stated their intention of going to the meeting and no doubt before the meeting starts there will be more members going from this Chapter, if the weather continues to be as nice as it is at present. It was with sincere regret that the members heard from Mr. Lippard that our National Secretary, Mr. Ford Lamb, was still seriously ill and would not be able to attend the Toronto meeting. A National Meeting without Mr. Ford Lamb will be a sad occasion, but knowing Ford, the members should just go ahead and double their efforts.

The speaker of the evening was Mr. Ralph E. Flanders, President of the Jones & Lamson Company and the Bryant Chucking Grinder Company, both of Springfield, Vermont. Mr. Flanders is also President of the New England Council and a member of William S. Knudsen's Machine Tool Co-ordination Committee. The meeting was originally scheduled for Monday evening, October, 6, but Mr. Flanders was drafted by our Government to be present at a meeting of the Machine Tool Builders and Office of the OPM and other Government Defense agencies to be held in Chicago on that date. Mr. Flanders gave a very interesting talk under the subject: "Tooling for Defense" and the introductory remarks reviewed the method of warfare employed years ago through the Civil War, the first World War and the methods of today. It was a very interesting talk and a rising vote of thanks was given Mr. Flanders.

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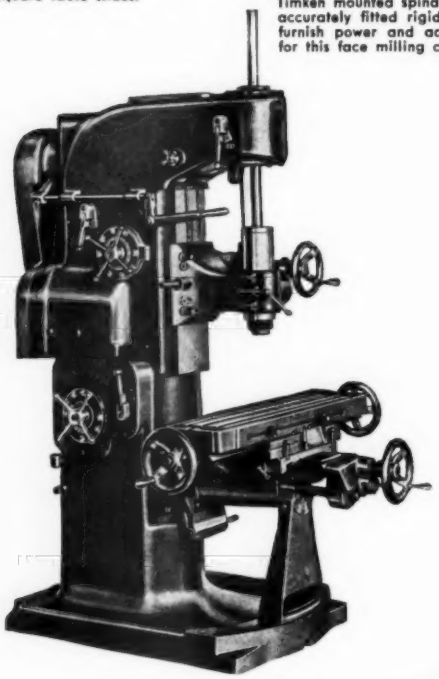
Ease of operation, quickly changed cutters, quick reading dials provide for efficient milling operations on this 20" x 25" steel plate.



A wide range of milling and boring operations, including angle work and jig boring, are possible with the Knight-Miller. Easy reading dials and readily accessible shift lever save operator's time.

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York

On September 26th the York Chapter held their first annual Ladies' Night entertainment. The program consisted of a dinner, entertainment by a magician, cards, and a talking moving picture.

The evening was very much enjoyed by those in attendance, particularly the ladies, and rumor has it that they would very much like to have another party around the holidays. This evening of entertainment not only brought out the ladies but also some of our members who have not been seen for a while.

The Central Penna. Chapter held its October meeting at Hostetters Play Barn in Lancaster on October 14. Approximately fifty members and friends from York made the trip to join with seventy-five members and friends from Lancaster. This meeting was arranged for membership promotion and proved very successful. Professor F.A.R. Hoffeditz, Supervisor of Vocational Education, at the William Penn High School in York was the coffee speaker, his topic being "The training of men for defense work." This subject was well explained and much enjoyed. Mr. A. R. Vidinghoff, Vice President of the Swing Mach. Company of Philadelphia, Pa., was the speaker of the evening. His subject: "Machine Tools and the Defense Program" was very interesting and gave a very clear picture of the enormous load that the Machine Tool Industry has to carry in our National Defense Program. He also spoke on the set-up and operation of O.P.M., and also what the Machine Tool Builders are trying to do in reference to future needs of manufacturing. Mr. Cal Bougher and Mr. Frank Hauser from Dewalt Products in Lancaster, in conjunction with our meetings, entertainment, and membership committee must be congratulated on the very well attended meeting which they promoted and we hope that there may be more of this kind.

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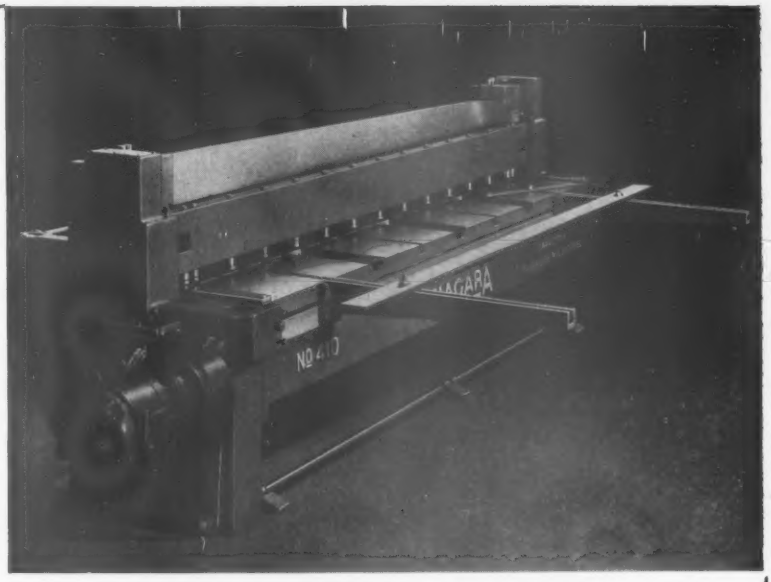

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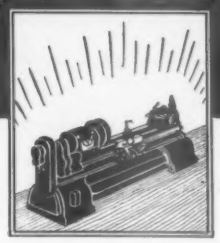

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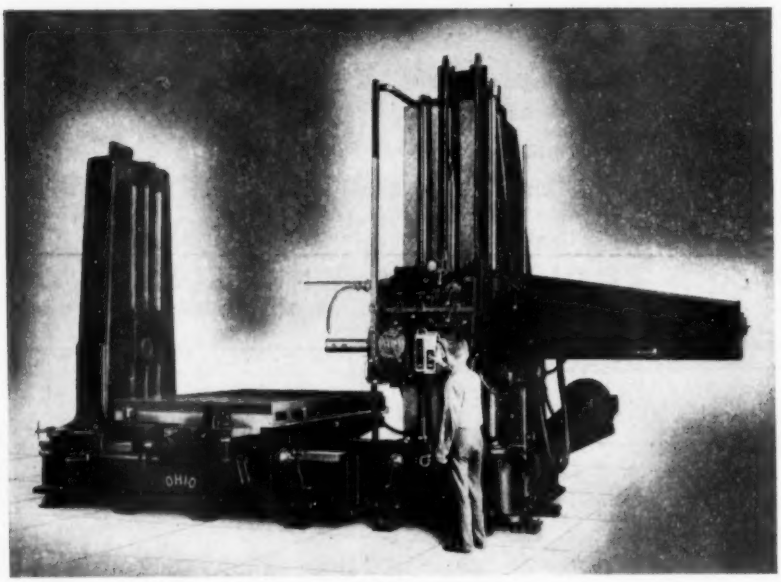
The Ohio Machine Tool Co., of Kenton, Ohio, is now building a larger Dreadnaught horizontal boring, drilling and milling machine with the following maximum specifications: 72" x 132" table, 60" wide bed, from 10' to 20' between face plate and bar support, 96" vertical travel of spindle head.

Design and construction are planned for accuracy, adaptability, sturdiness and efficiency, it is said. Noteworthy features are: anti-friction bearings throughout, automatic lubrication, built-in electrical power rapid traverse with push button control, narrow guide construction for all moving units, push button control for start-stop, forward-reverse and run-jog of the spindle, pressure lubrication to all sliding surfaces, unit construction, providing accessibility to all units, multiple splined shafts with splines milled from the solid for all sliding gears and clutches, and all mechanical clutches of the internal gear tooth type.

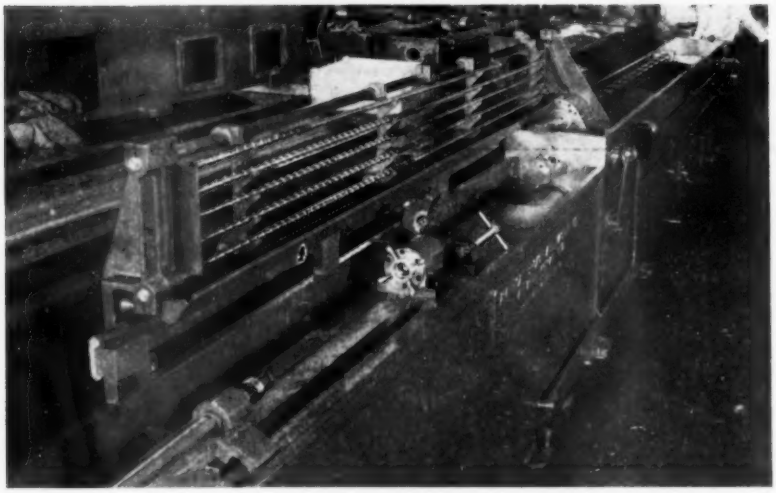
The box-shaped, counterbalanced spindle head carries the speed and feed transmission, the loads from spindle and gearing being transferred to the column face. All feed and speed changes are grouped so that the operator need not move from his normal position. A multiple-disc, magnetic type drive clutch gives complete spindle control through a portable push-button unit. The ratio between low and high speeds is 1 to 190 with maximum speed of 600 RPM.

Typical of the materials used are chrome nickel alloy steel feed and spindle speed gears, heat-treated and hardened; high tensile, alloy steel cast spindle driving sleeve with nitralloy bushings; nitralloy forged spindle, heat-treated and hardened; husky alloy steel shafting heat-treated and ground.

This machine is available also in a floor type with a wide range of specifications.



Dreadnaught Boring Mill
Designed for accuracy and efficiency.



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New developments recently brought out by the American Broach and Machine Co. in the rifling of 20 M/M cannons incorporate advanced engineering machine and tool design. These cannons are rifled by means of long spiral broaches, a process in use for some time but brought up to date by this company.

The success of this operation demanded that the broaches should be of a simple design so they could be serviced with the least possible expense and with equipment that was available on the market.

The tools consist of four broaches in a set. The first broach cuts one-quarter of the width of the groove to be broached, broaching all the grooves at one time, and cuts to practically the full diameter, minus a few tenths of a thousand.

The second broach cuts the same amount of stock, but the width of the splines being twice as wide as No. one, allows the second broach to cut a ribbon off each side of the previously cut groove.

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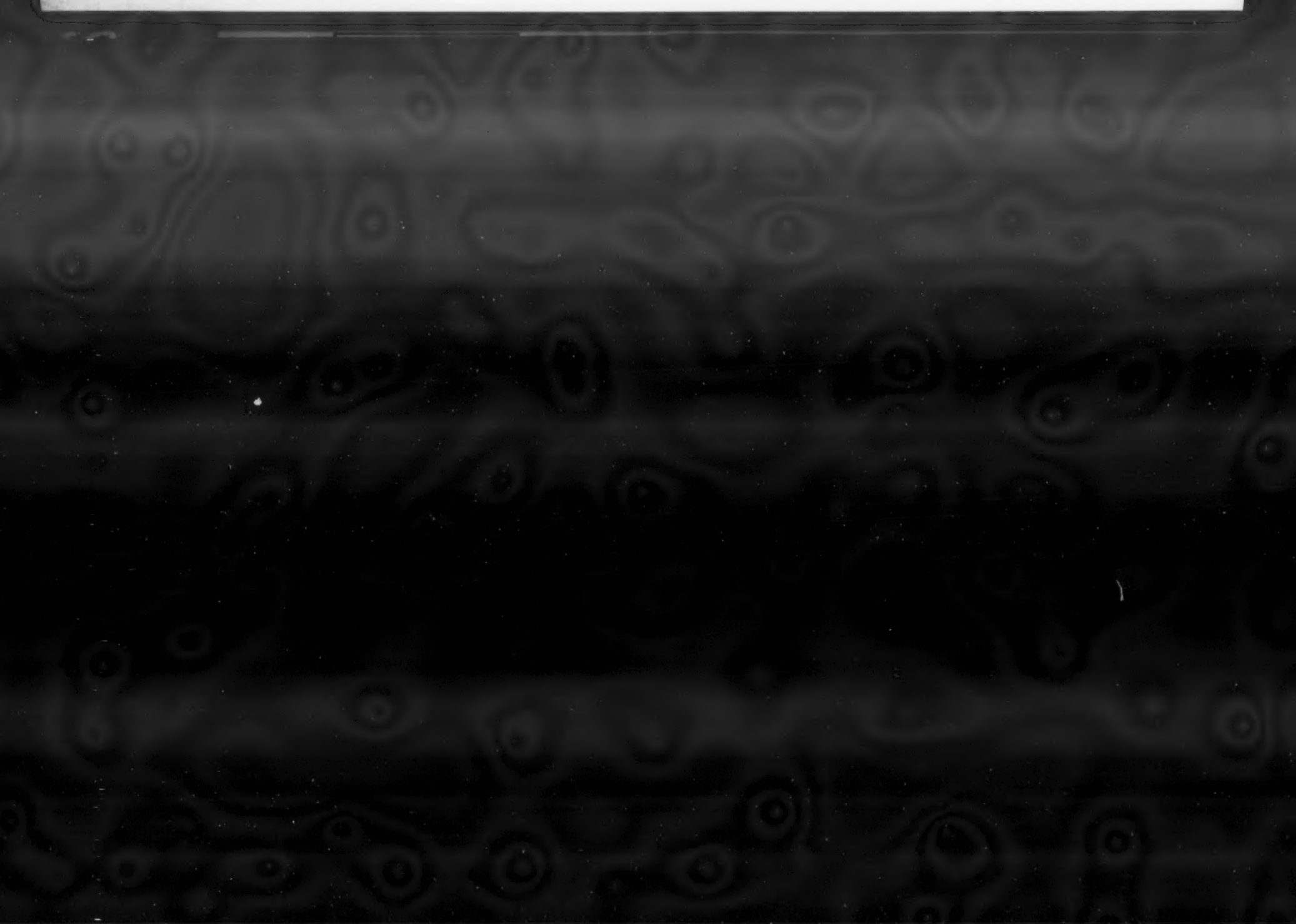


DEFENSE WELDING is definitely

C-F Positioner Welding

In the armament section of American Machinist for September the manufacture of arc welded gun carriages is described, in part, thusly . . . "Since all welding is down-hand, positioners are used wherever required." The positioners shown are C-F Welding Positioners. Not only here, but throughout industry, these time-saving machines which permit faster and better welding are definitely part of the defense job, in armaments, shipbuilding, transportation; everywhere. Investigation will probably show you that C-F Positioners will make your production welding simpler and more economical.

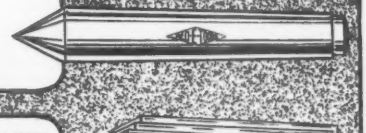
C-F Positioners are available in hand operated or power driven machines with capacities from 1200 to 15,000 lbs.

Our bulletin W P 20 will give you the facts. It is illustrated, interesting and free upon request.

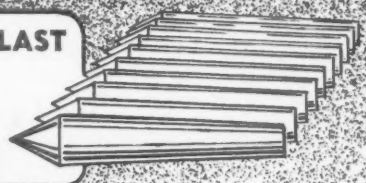
CULLEN-FRIESTEDT CO.

1338 S. KILBOURN AVE. CHICAGO, ILL.

1
RED-E CENTER



WILL OUTLAST
10
CARBON CENTERS



Because RED-E centers have high speed steel ends, giving longer life at high speeds — increasing output and reducing time for grinding points.

Write for Catalog E41

THE READY TOOL COMPANY
585 IRANISTAN AVE. BRIDGEPORT, CONN.

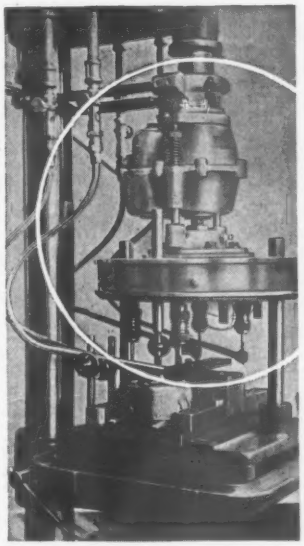
If it's HIGHER PRODUCTION you want on tapping or drilling

you can get it with an

Ettco-Emrick
MULTIPLE TAPPING or DRILLING HEAD

. . . and you can get it quickly and at low cost because these heads are made up entirely of stock parts "tailored to fit" your specific requirements.

You simply send us a drawing or sample part giving necessary tapping or drilling data. Our engineers, with some 25 years of specialized experience to guide them, figure out the best way to handle the job and work out a ***gear case assembly*** of standard gears, spindles and chucks arranged to do the job.



QUILL CLAMPS can be furnished for fastening heads rigidly to any drill press.

IF IT'S A TAPPING JOB

—This gear case assembly comes to you bolted to a standard Ettco - Emrick centrally driven and reversing friction clutch and face plate driving unit, like the one illustrated, with a taper shank to fit your drill press spindle.

IF IT'S A DRILLING JOB

—The gear case assembly is bolted to a standard Ettco-Emrick ball-bearing face plate driving unit with a taper shank to fit your drill press.

NOW GET THIS—

All gear cases are interchangeable on the tapping and drilling face plate units. Hence, one tapping and one drilling face plate unit will take care of the gear case assemblies for any number of different jobs and you can change from one job to another in a few minutes.

BULLETIN No. 3 gives you the whole story about this production-boosting, money-saving system. Write for a copy—today.

ETTCO TOOL CO.
586 Johnson Ave., Brooklyn, N. Y.
DETROIT • CHICAGO

The Famous *Ettco-Emrick* DRILL CHUCKS • TAP HOLDING CHUCKS
TAPPING ATTACHMENTS • TAPPING MACHINES
MULTIPLE SPINDLE TAPPING AND DRILLING HEADS
Unexcelled for Design, Materials and Workmanship

one quarter of the width, or three-quarters of the final width of the groove, and performs the same as the No. one and two broaches.

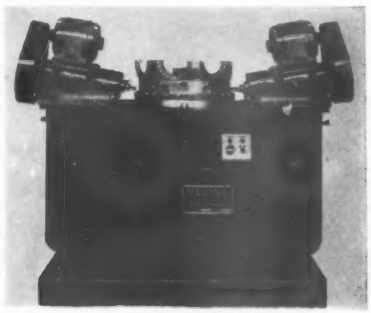
The fourth broach follows the same principle with the exception that at the finishing end several teeth are used for final sizing, finishing the splines to their full depth.

In the designing of these broaches, the threaded portion for pulling them has been made smaller in diameter than any other part of the broach. This is purposely done to weaken that part as a safety protection so that in the event of an accident the thread is always broken, in which case the pilot is of sufficient length so that the broaches can be re-threaded.

The machine developed for the broaching of these small cannons is a hydraulically operated Pull Type machine, built in two sections. The right hand portion is the machine and contains the hydraulic equipment, pulling head, hydraulic oil reservoir, pressure gages, spiraling bar and electric motor. The left hand portion contains the work fixture, lubricating pump and motor and lubricating oil reservoir. The machine is so designed that at any future date the right hand portion, the machine proper, can be used as a normal broaching machine for broaching of all shapes of holes, including splines, straight and spiral, in such work as comes within its pulling capacity. It provides a broaching unit of exceptionally long stroke.

MOLINE MILLER (F55)

A special, single purpose machine for the milling of spherical clearances in the ends of bolt holes which are used in tying together the crankcase sections of radial type aircraft engines, is announced by the Moline Tool Co., Moline, Illinois.



Milling Machine
Holes milled 2 at a time.

The crankcase section is clamped onto the round, indexing table. The operator then starts the cycle by push button control and the holes are milled two at a time, with automatic indexing from one pair of holes to the next until the work is complete and the cycle stops.

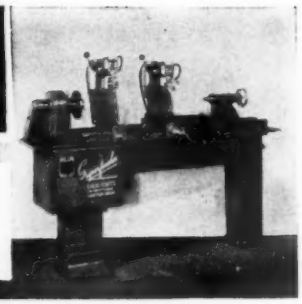
Electrical and mechanical interlocking prevent the cutters from entering the work anywhere except at the desired points directly over the centers of the holes.

PACIFIC VERA LATHE (F56)

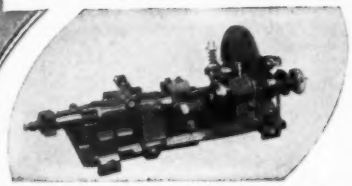
A highly improved second operation machine, the Pacific Vera-Lathe, with an infinite number of variable spindle speeds from 5000 RPM down to 1250 RPM, and with a hollow spindle design and a novel collet operating mechanism, has been introduced by the Pacific Tool & Die Co., 1225 East 63rd Street, Los Angeles.

It has been especially designed for polishing, buffing, burring, filing, sizing, finishing and lapping round parts. One feature is the collet operating mechanism on the front end of the spindle. This design saves time by permitting the spindle to rotate while the work is inserted into the collet and eliminates the

OHIO UNITS Superfinisher
LICENSED BY CHRYSLER



Both These Machines Vital for Speeding Up Defense Programs

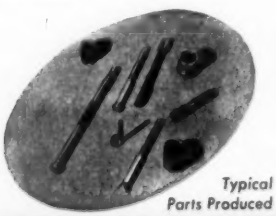


OHIO UNITS CAM GRINDER UNIT READY FOR MOUNTING ON GRINDER

CAMS . . . odd shaped parts . . . are produced on OHIO MULTIPLE CAM GRINDER UNITS. The Ohio Multiple Cam Grinder Units are compact . . . sturdily built and designed for mounting on practically ALL STANDARD CYLINDRICAL GRINDERS.

These cam grinders incorporate an exclusive principle of contour control, found in no other machines and provide advantages in production, duplication, and most important of all, accurate parts. They have been thoroughly proven as a valuable unit by years of satisfactory service with leading manufacturers in all types of industries. Constantly, new applications are being found where they save time and money and increase the accuracy of a product.

Write for our catalog which describes these machines thoroughly, and shows you why we can duplicate accurate parts to close limits.



Typical Parts Produced

SUPERFINISHING two diameters simultaneously

Here is a job that requires a fine finish at a high production rate. This piece has a SUPERFINISH surface approximately 25" long and 1½" in diameter and two surfaces approximately ½" wide and 4" in diameter. The SUPERFINISHING on all these surfaces is done simultaneously. Two SUPERFINISHING heads are used—the one at the left is stationary and the stones are oscillating while the work is being revolved on the two flanges. The other head is mounted on a separate table which automatically traverses in both directions on the bed covering the entire length of this bearing surface which is approximately 25" long. On this same machine many other parts can be SUPERFINISHED. A flat SUPERFINISHING attachment can be attached to this machine. We have mounted as many as ten SUPERFINISHING heads on a single machine, doing that many operations simultaneously.

The machine is of simple design with motor and pump for the lubricating and SUPERFINISHING liquids self-contained and incorporated in the design. If your work requires ultra smooth surfaces you should investigate modern SUPERFINISHING as obtained on the OHIO UNITS SUPERFINISHER.

Send samples for SUPERFINISHING or send us your blueprints for recommendations and ask for our latest bulletins on SUPERFINISHING.

OHIO UNITS MANUFACTURERS • DAYTON, OHIO, U. S. A.

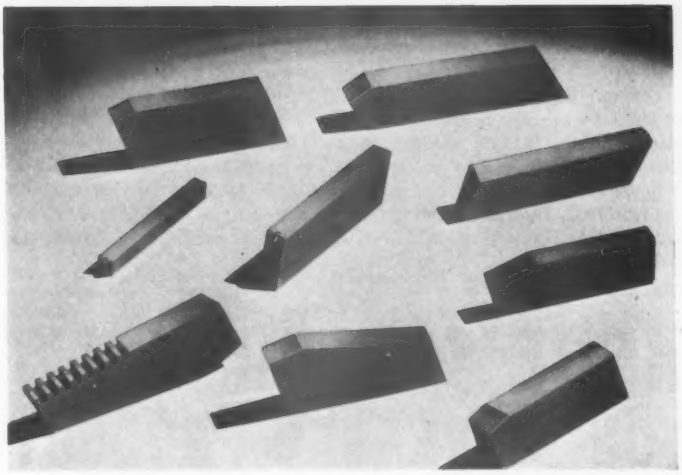
Increase Machine Output — Less Downtime

CROBALT performs exceptionally well when machining ferrous or non-ferrous material.

CROBALT has been developed to have greater resistance to impact, freedom from clipping and less grinding checks than competitive alloys.

CROBALT is a cast non-ferrous alloy which retains its hardness under high operating temperatures. It possesses the toughness of high speed steel and abrasive resistance of carbides.

CROBALT is being supplied to a wide cross section of industry and new uses are constantly being developed.



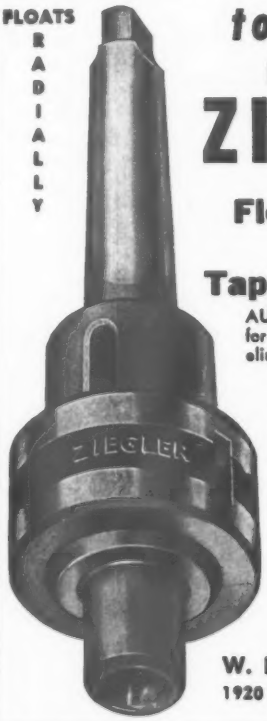
SPECIAL CROBALT MILLING CUTTER BLADES
Sizes to Meet All Milling Requirements

WRITE FOR DESCRIPTIVE FOLDER ★ ORDERS PROMPTLY FILLED

CROBALT INC., ANN ARBOR, MICH.

Having difficulty holding tolerances?

FLOATS RADIALLY



DEMAND THE

ZIEGLER

ROLLER DRIVE
Floating Holder
for
Taps and Reamers

AUTOMATICALLY compensates for machine spindle misalignment, eliminating over-sized or bell-mouthed holes.

Helps produce unbelievable accuracy on both new and old equipment.

Furnished with male or female taper, straight, threaded or special shanks to fit any machine used for tapping or reaming.

W. M. ZIEGLER TOOL CO.
1920 Twelfth Street DETROIT

Want ACCURACY?
--- Use J. K. SMIT & SONS
PRECISION
Diamond Tools

The illustration shows the effective design of the STA-KOOL Diamond Tool Holder.

STA-KOOL—Dissipates Heat
Prolongs Life
Reduces Cost

Write for further information about STA-KOOL— "Tool Engineered" for precision.

J. K. SMIT & SONS, INC.
157 Chambers Street, New York, N. Y.
7 South Main St., West Hartford, Conn. — Law and Finance Bldg., Pittsburgh, Pa.
Detroit — Chicago — Seattle

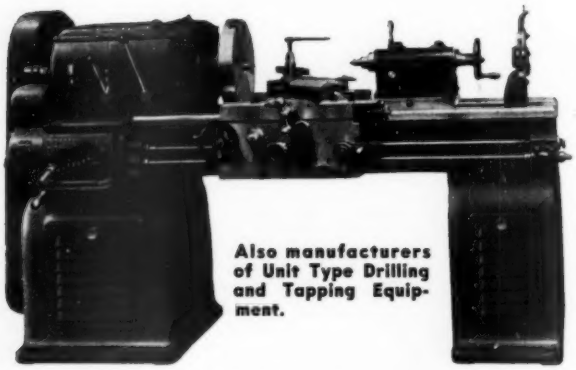
attendant wear caused when machines must be stopped to chuck the work. This collet can also be foot-operated if so desired. Interchangeable spindles can be furnished to accommodate a chuck or other applications.

The spindle is ball-bearing mounted, on specially selected bearings. It has a hole its entire length, through which passes a hollow draw tube with a 13/16" bore for holding the ¾" maximum capacity collet. The tension of the collet can be easily adjusted to the proper required amount by a simple turn of a round adjustment handwheel located on the back end of the spindle. It is also simple to change collets by this same handwheel.

Various spindle speeds are quickly obtained by turning a handwheel located on the side of the lathe for selecting the proper and most efficient speed for the work. Usually high speeds are required for lapping, polishing, and buffing, while the lower ranges are found more suitable for burring and filing.

HERE'S YOUR ANSWER FOR INCREASED PRODUCTION

If you have a labor shortage you need all the more to get the most efficient results from your factory equipment. Here is a lathe designed to answer today's cry for stepped-up production, increased efficiency, accuracy, and adaptability to a wide range of jobs.



Also manufacturers of Unit Type Drilling and Tapping Equipment.

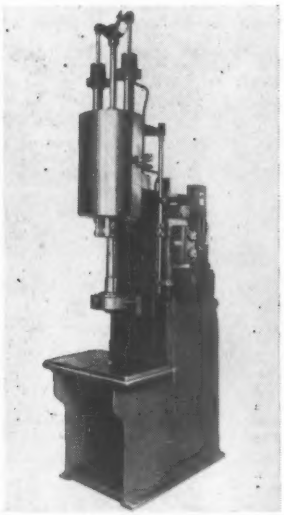
Send for Free Bulletin that gives full details and specifications

Bradford lathes have 12 selective speeds, ranging from 16 to 400 RPM, quick change gear box for selective speeds and thread cutting, push button start and stop, multi-disc clutch and brake, accurate spindle control, Timken bearings or taper bronze bearings on high carbon steel spindle, hardened alloy steel gears running in oil, and many other distinctive features.

THE BRADFORD MACHINE TOOL CO.
CINCINNATI, OHIO
PRECISION TOOLS SINCE 1840

GIERN & ANHOLTT (F57) VERTICAL CARBIDEBORER

The Giern & Anholtt Tool Co., of 1312 Mt. Elliott Avenue, Detroit, Mich., announces a re-modeled, re-designed vertical Carbideborer model 2V, to meet the growing demand for specially designed machine tools for tungsten carbide boring. The 2V has a heavier column, a one piece spindle saddle, electrically controlled dwell for facing, and a new electrical switch mechanism E.T.C.



Carbideborer
Has Gatco revolving bushing.

The outstanding feature is the Gatco revolving bushing which is located at all times immediately above the work, and an arrangement for mounting another one into the table for the guiding of the front pilot in case of deep boring.

The travel is 18 inches, the capacity ranges from .750 inches to three inches depending on materials worked upon, the speed is from 380 RPM up, the feed is hydraulic and the drive is by V-belt.

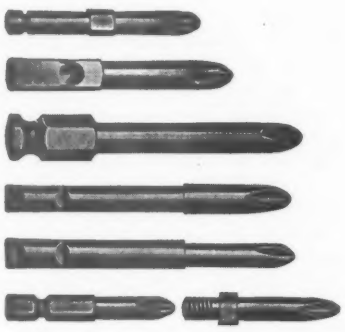
CLEARING (F58) SHELL FORGING MACHINE

A shell forging machine designed to produce from 240 to 300 finish-drawn 90 mm. shell forgings per hour, directly from hot steel billets, is announced by Clearing Machine Corporation, Chicago, Ill. The first of these machines is already in operation.

Eliminating all manual handling of the shell forging from the placing of the hot billet in the de-scaler until the finished drawn forging is ejected onto a cooling conveyor, this completely automatic machine requires less men to operate while producing from 3 to 5 times as many shells per hour as con-

When you have a screw driving job
APEX has a POWER BIT for it

PHILLIPS SCREWS • SLOTTED HEAD SCREWS • CLUTCH HEAD SCREWS



For Phillips Screws

Four sizes of APEX-Phillips Power Bits drive the entire range of Phillips wood screws, machine screws, sheet metal screws and stove bolts. They are available for nearly all makes of electric, air and spiral drivers, in two grades—General Purpose for the standard screw, and Super Service for case-hardened, self-tapping screws.

For Slotted Head Screws

APEX Power Bits for slotted screws fit the four types of heads commonly used—round, flat, oval and binding. For certain operations where the standard Bit cannot be used, special Bits are furnished to fit the job. APEX Power Bits are available for all popular electric, air and spiral drivers, in the two grades.

For Clutch Head Screws

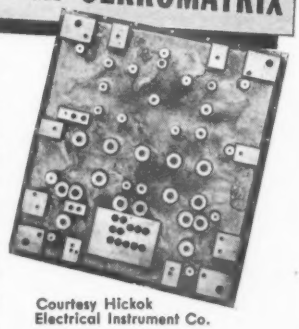
APEX Power Bits for clutch head screws are now available for many makes of electric, air and spiral drivers. Send us the type and size of power tool used for detailed information and prices.

Whatever your needs are in Power Bits for power drivers, write APEX.

The APEX MACHINE & TOOL Co.

1106 Patterson Blvd. **Dayton, Ohio**

SAVE DIE STEEL *by using* bushings held in CERROMATRIX



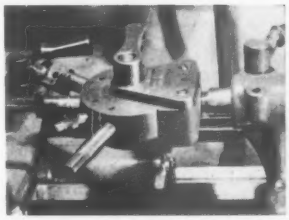
Courtesy Hickok Electrical Instrument Co.

In these days when defense requirements make die steel a precious metal, why waste it by using solid hardened steel die plates? Tool steel bushings will serve the same purpose and they can be secured quickly and accurately with CERROMATRIX on a flat steel plate. The method of making such dies is fully described in the CERROMATRIX Manual, which will be sent free on request. This is only one of many ways in which low-temperature-melting, non-shrinking Cerro Alloys are serving and saving in metal-working shops.

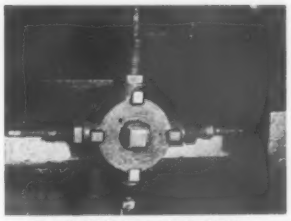
Send for this Manual

CERRO DE PASCO COPPER CORPORATION
40 WALL STREET NEW YORK, N. Y.
BRITISH ASSOCIATES: MINING & CHEMICAL PRODUCTS LTD., LONDON
CANADIAN DISTRIBUTORS: DOMINION METAL PRODUCTS LTD., MONTREAL

REDUCTION IN PRICES of QUADRUPLEXES



QUADRUPLEX TURRET TAILSTOCK
$15.00 F.O.B. BLOOMFIELD, N. J.



QUADRUPLEX LATHE STOP
$15.00 F.O.B. BLOOMFIELD, N. J.

NOW, you can eliminate production bottlenecks at minimum cost. Your present equipment, fitted with QUADRUPLEX turret tailstocks and lathe stops is immediately capable of multiple machining operations. A mere flip of the lever permits the start of a new operation in a fraction of the time which it normally takes to change tools and readjust distances.

SAVES TIME, SAVES DOLLARS, SPEEDS PRODUCTION

IMMEDIATE DELIVERY FROM STOCK

WRITE TODAY FOR DETAILS

SPECIALTIES MANUFACTURING COMPANY, Inc.
35 Farrand Street **Bloomfield, N. J.**

Shell Forging Machine
Makes 300 shell forgings per hour.

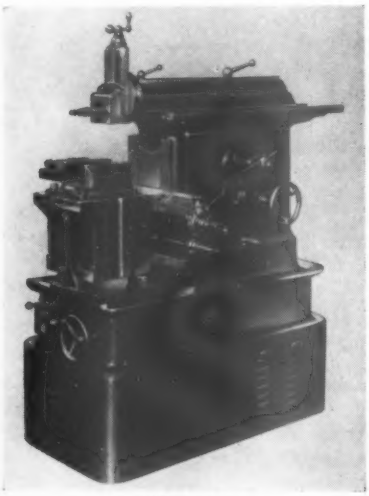
ventional upsetting machines, it is said.

A steel billet is converted into a finish-drawn shell in four operations. In the first operation, the billet is slightly upset to fit it firmly in the die and at the same time is lightly pierced. In the second, piercing is continued and the billet is changed from a square to a round form. In the third, piercing of the cavity is completed. The fourth operation consists of drawing the shell.

New features of this machine include a rotary indexing die table, self-aligning punches and mandrel with automatic stripping, combination roller and ring dies for final drawing of the shell, automatic cooling of the punches and mandrel between each operation, and an automatic lubricating system for dies and punches designed for use of the new shell forging lubricants containing "dag" colloidal graphite now being made available nationally by major oil companies.

VERNON SHAPER (F59)

Engineered to meet tool room and industrial demands for a shaper having wide speed ranges and capable of working to close tolerances, the Vernon shaper incorporates both features in a



Shaper
Works to close tolerances.

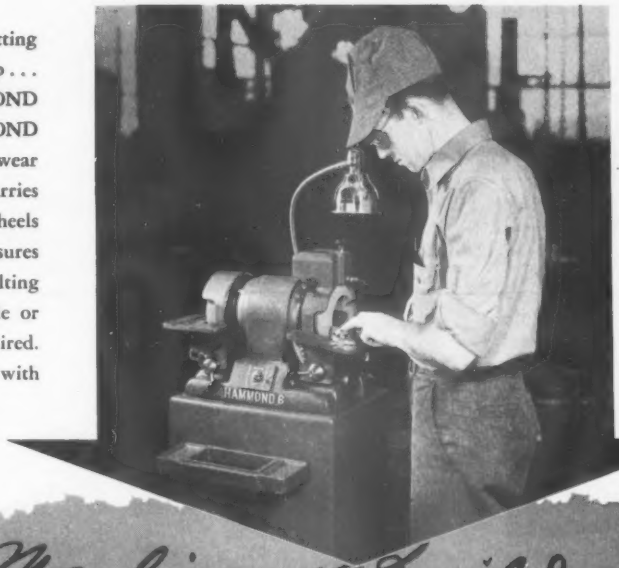
compact, easily operated unit. It is announced by the Machinery Manufacturing Co., 1915 East 51 Street, Vernon, Los Angeles, California. Castings used for strategic parts subject to stress and strain are normalized.

The heavily ribbed Vee type ram is so designed that it has 60 percent bearing surface when ram is at extreme stroke and completely forward in ram bearings. The supporting column is ribbed with wide dovetails. The cross

THEY'RE
HOLLOW MILLING
THESE "PRODUCTION-LINE JOBS" THE Short Way
Makers of these and hundreds of other hollow milled parts have switched from single point tools to Namco Hollow Milling Multiple Cutter Heads because—
4 chips at each pass give them 300% gain in cutting time alone.
On jobs having more than one diameter, shoulders and radii, they eliminate fussing with separate single point adjustments, for one simple adjustment in a Namco head brings all the cutters into final position.
With duplicate sets of cutters reground and checked in the tool room, ready—there is no fussing with individual tools, no scrap loss in getting started—production is practically continuous.
You can hollow mill or cut threads with the same Namco head simply by changing cutters and blocks—"Double Duty" tools.
Ask us to show you how the SHORT WAY will save time and cost on your hollow milling jobs.
NATIONAL ACME
170 EAST 131ST STREET • CLEVELAND, O.
ACME-GRIDLEY 6-A AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

Keep tools Sharp FOR CONTINUOUS *Peak* PRODUCTION !

Today's blazing production pace calls for sharp cutting tools. And there's no better way to keep 'em sharp . . . easily and accurately . . . than with a HAMMOND CARBIDE TOOL GRINDER. Take the HAMMOND "6" (at right). It's massively built to withstand wear and vibration, that arch-enemy of accuracy. Carries 6" silicon carbide wheels both ends (or diamond wheels with drip-feed tanks for finish grinding). Measures grinding angles exactly with scales below the tilting tables. Single lever locks table at desired angle or releases for quick table removal. No tools required. Totally enclosed motor is ½ HP . . . reversible . . . with oversize spindle and bearings. Keep up! Keep tools sharp with a HAMMOND GRINDER! Write for Bulletin TODAY!



Hammond Machinery Builders INC.

1636 DOUGLAS AVENUE • KALAMAZOO • MICHIGAN

Unusually Difficult Jobs Emphasize The Quality of Putnam End Mills

A deep cut . . . an intricate shape . . . a tough material . . . they're all "taken in stride" when Putnam End Mills are used. And in the milling operations, chips pile up quickly and without interruption as metal is removed by the tools that "Cut Faster and Last Longer".

Putnam Hi-Speed End Mills are furnished in a complete range of types and sizes.

PUTNAM TOOL COMPANY

2987 Charlevoix Ave. • Detroit, Michigan

THOSE WHO MAKE HARDNESS INSPECTION TESTS ARE BUILDING GOOD WILL . . . FOR THE ONLY FOUNDATIONS OF GOOD WILL IN BUSINESS ARE GOOD PRODUCT AND FAIR DEALING

"ROCKWELL" HARDNESS TESTER

WILSON

MECHANICAL INSTRUMENT CO., INC.

Concord Avenue, N. Y. City

rail is stress ribbed and tapered gib maintains uniform bearing surface and permits easy adjustment. The cross feed is automatic in both directions, cam actuated, and is accurately synchronized with the return stroke of ram. Seven speeds are available, ranging from .0025 inches to .0175 inches.

Other features include friction-type dials for quick adjustment, accurately graduated to .001 inches. Bronze and felt wipers are provided for all dovetails. The tool head has a tapered gib and the tool post is of forced steel.

MARQUETTE ARC WELDER (F60)

A new A.C. arc welder, series "160" is announced by the Marquette Mfg. Co. Inc., Minneapolis. Class B, all asbestos insulation, and silicon transformer steel are used in their construction.

ATLAS DRILLING MACHINES (F61)

The Atlas Press Co., Kalamazoo, Michigan, announces new multiple spindle drilling machines in series of two, three, and four-spindles, to step up production on small hole drilling and

Multiple Spindle Driller
For small hole drilling.

tapping operations. The drilling heads of these machines incorporate the ball bearing equipped floating drive featured in all Atlas heavy duty drill presses.

Table weight of the three and four-spindle machines is reported at 575 pounds, furnishing a solid support for the smooth movement of heavy jigs, fixtures and parts in production quantities. Each drilling head is equipped with its own motor mounting and a new type of positioning control with crank handle.

Center distances between spindles is 15", 18", and 13" respectively; table to Jacobs chucks, 26"; to No. 1 Morse tapers, 24¼"; column to center of spindle 7½"; table surface (3 and 4 spindle machines) 21" x 54"; spindle travel 4"; drilling heads SKF ball bearing equipped; motors recommended 1/3 or ½ HP 1740 RPM; net weight less motors 1100 lbs. (4 spindle machine).

WALKER-TURNER POLISHING LATHE (F62)

Adaptable to handling many jobs now being done on conventional lathes or similar machines, a new foot-operated speed lathe introduced by the Walker-Turner Co., Inc., of Plainfield, N. J. will be found to have many uses in all types of manufacturing and fabricating plants, it is said.

Its many uses include polishing, burring and lapping on ferrous metals, nonferrous metals and plastics. It will chuck rounds, tubing and hexagonal shapes up to two inches in diameter.

SPEED TREAT STEEL
.40-.50 CARBON OPEN HEARTH
X1545
1. HEAT TREATMENT
Standard Treatments Give Results Comparable to Those Attained with SAE 1040 - 1045 - X1335, Etc.
2. DUCTILITY
3. INCREASED PRODUCTION
4. MACHINABILITY
5. STRENGTH
THANK YOU!
To friends both old and new . . . thanks for your patience. We are doing our very best for Defense . . . and also for you.

Licensee for Eastern States
THE FITZSIMONS COMPANY
YOUNGSTOWN, OHIO

Licensor
MONARCH STEEL COMPANY
HAMMOND • INDIANAPOLIS • CHICAGO
PECKOVER'S LTD., Toronto, Canadian Distributor

MANUFACTURERS OF COLD FINISHED CARBON AND ALLOY STEEL BARS

For MACHINE SHOPS • FACTORIES • LARGE TOOL ROOMS

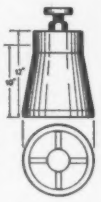
LARGE (48" X 96") SURFACE PLATE

PRECISION ENGINEERED

Ingeniously ribbed for great strength without excessive weight. Seven support-points allow maximum flexibility of use for all shop needs.

MADE BY MASTER TOOLMAKERS

Five adjustable blocks are provided with each plate. (Choice of 10" or 12") 1-1/2" screw, 6" long, fitted with 2-3/16" hexagon nut, allows 2" adjustment to compensate for floor irregularities, etc.



Ideal

FOR LAYING-OUT AND INSPECTION OF JIGS, FIXTURES, ETC.

● Cast in a machinery grade of semi-steel and finished with "professional" skill this large surface plate is *accurate* ... plane within .005 in. Formerly made only for our own use, the plates aroused so much interest that they are now offered for sale. Especially adapted to provide a plate of widest, most flexibile use.

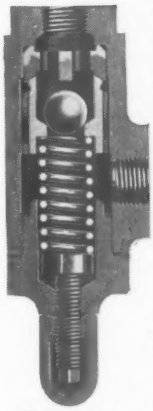
Made by an organization famous since 1912 for the manufacture of machine tools, jigs, dies and fixtures. Write for price of the surface plate, or further details—or inquire about your tooling problems in general. South Bend Tool and Die Company, 2211 South Main St., South Bend, Indiana.

SOUTH BEND TOOL & DIE COMPANY

FOR BETTER CONTROL OF

Fluid Power Machines

... OILGEAR VALVES



Oilgear Foot Valve... exclusive Oilgear Ball and Check design.

IT is vital to note that in the great defense plants where production must keep moving, Oilgear Fluid Power Valves have preference.

Behind Oilgear Valve design and construction stand pioneering knowledge, over 20 years of experience, unbroken leadership ever since hydraulic machines were first used industrially. The sure selection of the *right* control valves for your needs is backed by such design superiorities as extra-long piston seals which reduce slip and give smoother operation, absence of restrictions in oil passages, and by exclusive design features such as the ball and check construction of Oilgear foot valves illustrated at left. Write for full information on these unequalled valves at once. Today's needs cannot be compromised. THE OILGEAR COMPANY, 1312 W. Bruce Street, Milwaukee, Wisconsin.

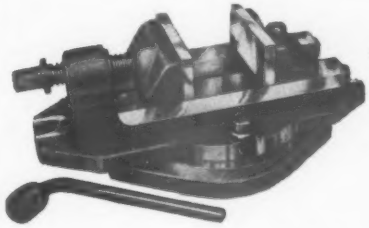
Oilgear Valves... Directional Control, Pilot, Combination, Relief, Foot, Resistance, Surge, Air Drain and special custom built types.

OILGEAR

Trademark Reg. U. S. Pat. Off.

QUICK DELIVERY

On Producto Machine Vises



We are still able to assure prompt delivery from coast to coast.

Accurate and absolutely secure holding are assured on these rugged vises. Bodies are of semi-steel, reenforced with hardened and ground wearing surfaces. Adjustable position jaws provide extra large opening. Two sizes, 6" and 4½". Plain and Swivel Types. Also Producto Cam Lock Vises for production milling. Made in 3 sizes 4"—5"—7".

MANUFACTURERS OF PRODUCTO DIE SETS AND DIE MAKERS' ACCESSORIES

THE PRODUCTO MACHINE CO.

990 Housatonic Avenue

BRIDGEPORT CONNECTICUT

3017 Medbury Ave., Detroit, Michigan

This lathe is equipped with a three phase motor in direct drive or gear drive types. A foot pedal controls the motor switch and a synchronized brake, which brings the spindle to an instant stop when motor circuit is broken. The brake will hold spindle stationary while work in the chuck is being changed.

PORTER-CABLE WET-BELT GRINDER (F63)

A new circulating, force feed coolant system for their Type G-8 wet abrasive belt grinder has just been announced by the Porter-Cable Machine Co., of Syracuse, N. Y.

It is connected to the base of the grinder, and is operated by V-belt connection to the machine's main drive pulley. The frame is cast iron, housing a reservoir, gear-type pump, and a cylindrical straining screen. A removable head above the screen gives accessibility for cleaning. All moving parts are completely guarded. The circulating unit allows for use of this machine in any part of the plant without connections to water or drain pipes, and makes possible the use of any desired liquid coolant. It also makes practical the reclamation of ground off particles desired to be reclaimed.

Wet Belt Grinder
Has new circulating unit.

The wet-belt grinding method is finding wide use on many grinding and surfacing operations on metal, mineral, plastic, ceramic, and other materials.

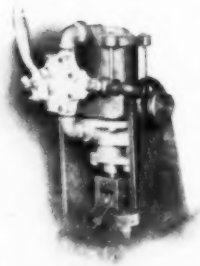
DELTA DRILL PRESS (F64)

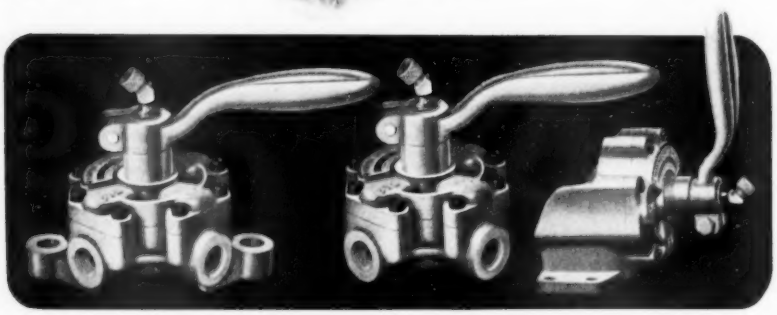
A new improved type of power feed drill press has just been announced by The Delta Mfg. Co., 609-K E. Vienna Ave., Milwaukee, Wis. The unusual design of the power feed unit, which oper-

New Drill Press
Operates off bottom drive.

Hanna "Unitite" Valves

—VITAL LINK between POWER and PRODUCTION





THERE must be a link between power and actual production—a method of control if maximum efficiency and economy is to be realized. You need positive, quick-action control valves . . . and that's where Hanna "Unitite" Valves come in. Available in 3/8", 1/2", 3/4", 1" and 1 1/4" pipe sizes, these dependable, packless valves are designed and built to give you exacting control of power for today's production requirements. Full details and literature will be sent on request, without obligation.

HANNA FOOT OPERATED VALVES: —Packless spool type. Piston moves but 7/16", foot pedal through a 10 degree arc for full reversal of line pressure. Operator depresses foot pedal to admit line pressure to cylinders. Valve piston seats in bonnet which may be removed without disturbing pipe connections.

HANNA REMOTE CONTROL VALVES:—Packless spool type. Requires minimum lever travel and force making it ideal for levers, or other forms of remote control. Piston seats in valve bonnet permitting removal without disturbing pipe connections.

HANNA TWO DIRECTION SPEED CONTROL VALVE: —For controlling piston speed in both directions. Installed between the operating valve and one end of a cylinder, it provides adjustable control of inflow as well as exhaust of the air independently to and from one side of the piston.

HANNA ENGINEERING WORKS
1765 ELSTON AVENUE • CHICAGO, ILLINOIS
Air & Hydraulic RIVETERS • CYLINDERS • Air HOISTS

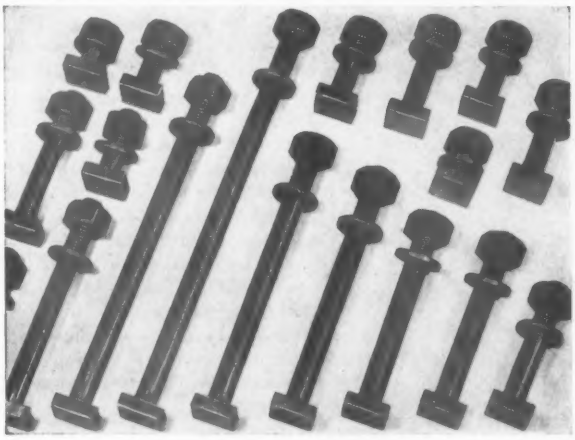
Leads the Field TWO WAYS!

IN ACCURACY. If *precision* tapping is your problem, the Haskins Type C Tapper is your answer. So finely engineered is this sensitive machine, it is now being used in the manufacture of *micrometers* — and *doubling* production, too! Class 3 and 4 fit are maintained with ease when the job requires it.

IN SPEED. Easily adaptable to magazine, dial and hopper feed operations, this *air - controlled* tapper goes through its cycles automatically — as fast as the operator can load and unload the work. And that's *all* he has to do! *Of course,* tap breakage and tapping costs go *down* — tapping production goes sharply *up!*

SEND FOR FREE BOOKLET
Illustrating Haskins Tappers at work and giving complete specifications for the three capacities in which Type C is available. R. G. Haskins Company, 2756 W. Flournoy St., Chicago.

R. G. HASKINS CO.



SMB BOLTS

Save the Machine—Save the Job—Save Time

T-slot bolts of soft steel and ordinary manufacture may do the job for a while—but they wear quickly and are likely to cause serious damage to the accuracy of costly machine tools.

It is good insurance to use SMB Bolts because they are made of chromium molybdenum steel, heat treated, and heads are machined square with bodies. This special care in manufacture safeguards the accuracy of tool room machines.

For best results be sure to use SMB Washers and Nuts. Both are heat treated and nut threads are cut square with face of the Nut.

Boyar-Schultz Corporation

2116 Walnut Street — Chicago, Illinois

LASTS 50 TO 100 TIMES LONGER!

The Tungsten Carbide lathe and grinding centers of the Circle Tip Tool Company are equipped with a hard wear and gall resisting metal, lasting from 50 to 100 times as long as High Speed steels.

STANDARD CENTERS

Morse Taper		Jarno Taper		Brown & Sharpe Taper	
No. 1	$3.00	No. 4	$3.00	No. 7	$4.00
2	3.50	5	3.25	8	5.50
3	6.50	6	4.00	9	7.00
4	10.00	7	5.00	10	10.00
5	15.00	8	6.50	11	12.50
		9	7.00		
		10	9.00		
		11	10.00		

CIRCLE TIP TOOL CO.

HIGH RESISTANCE TO ABRASION

EAST ORANGE — NEW JERSEY

Prices on Special Centers on Request

Write us for prices and catalog on Standard Tungsten Carbide Tip Tools

ates directly off the bottom drive of the motor instead of off the spindle, makes possible a wide range of feeds from .0010 to .016 inches per revolution of spindle in the slow speed drill presses and from .0005 to .009 inches in the high speed machines.

Two four-step cone pulleys and a special belt tension release make feed speed changes quick and safe. The sturdy bronze gear in the power feed and the specially hardened and ground steel worm assure accurate stopping, it is said.

Other features include quick traverse by hand from starting position to work, instant switching from power to hand feed and reverse without changing or removing parts, safety lock for preventing damage to drill press when power feed is disengaged, and adjustable automatic stop and return. This new line includes single and multiple spindle 17 inch units, in slow speed and high speed models with table raising or head raising mechanisms, powered with either Delta or standard NEMA frame motors.

Standard Tools
All Types--All Sizes

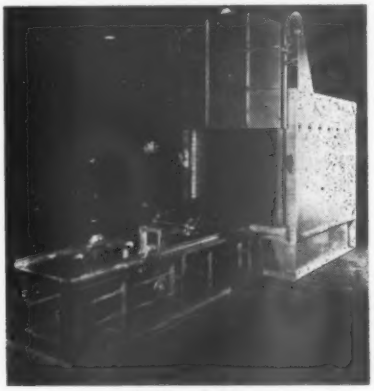
Gairing counterbores, countersinks, back spotfacers and core drills, (cutters, holders and complete assemblies) are supplied in high speed interchangeable, solid, adjustable and inserted blade types. Large stocks available. Special sizes to order. Our modern facilities are backed by a quarter century of specialized experience. Make use of them.
Gairing TOOLS
The GAIRING TOOL CO., Detroit, Michigan
In Canada: Hi-Speed Tools Ltd., Galt, Ont.

SPECIALISTS IN FINE CUTTING TOOLS FOR 24 YEARS

LINDBERG ROLLER-GRID (F65)

An automatic roller grid developed by the Lindberg Engineering Co., 2450 West Hubbard Street, Chicago, for use with the "Cyclone" forced convection box type furnace, makes possible a speed-up in non-ferrous quenching operations.

The roller grid on this type of installation is powered by an air cylinder which



Roller Grid
Used on "Cyclone" furnace.

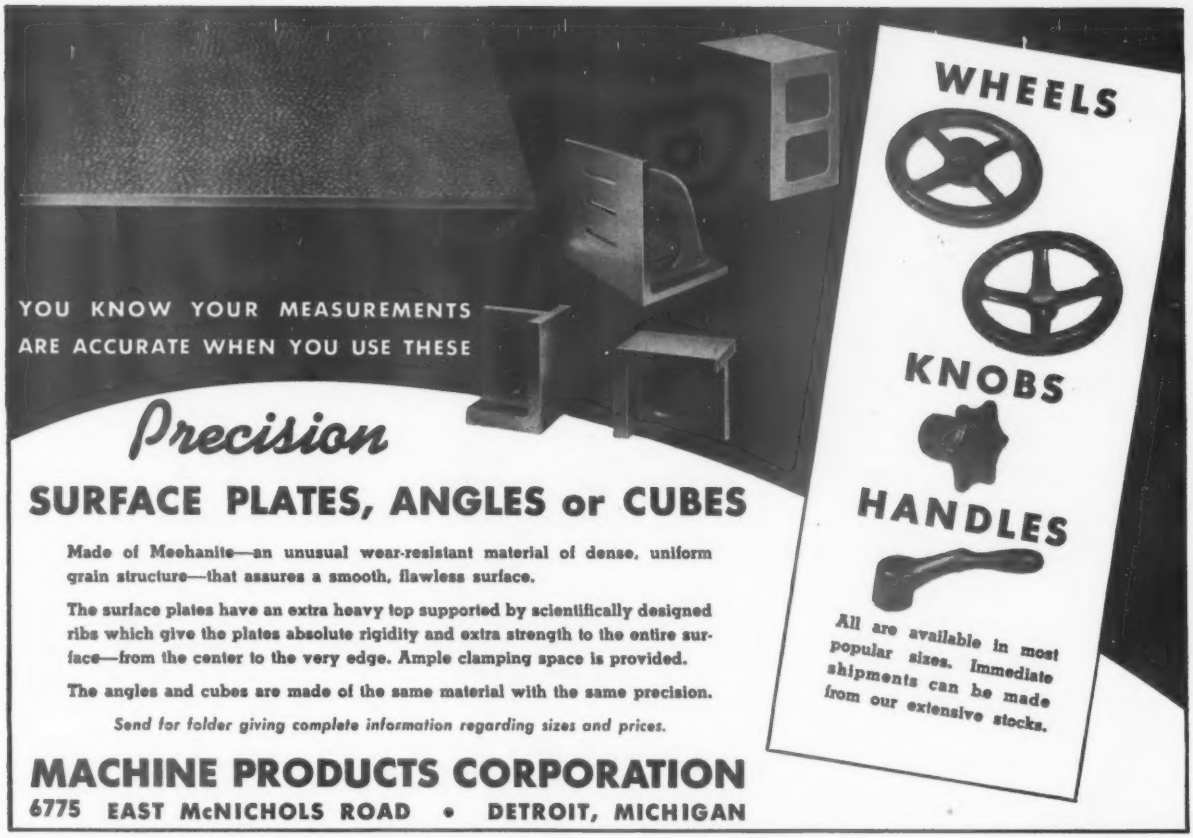
pushes a carriage to the work chamber where the roller grid is automatically engaged. The carriage then quickly pulls the roller grid along the tracks from the work chamber out into the open where the work is easily accessible, and can be rapidly removed for quenching. The grid is then reloaded, and automatically moved back into the work chamber where the carriage disengages the roller grid, and moves back to allow the hand controlled air operated vertical lift door to lower into place.

Heating is by the "Cyclone" principle which employs a high velocity fan which forces large volumes of air under pressure and at velocities of around two miles a minute over the heating elements and through all parts of the work chamber. Heating is rapid, and all parts of the charge are heated to exactly the same temperature. As a result production speed is increased and rejections reduced.

HAMMOND CARBIDE TOOL GRINDER (F66)

A new 10" carbide tool grinder combining facilities for Straight Wheel peripheral and Cup Wheel face grinding has been announced by Hammond Machinery Builders, Inc., 1636 Douglas Avenue, Kalamazoo, Mich.

Work tables on the new grinder tilt from 0° (at level) to 25°, each degree of tilt measured by a scale mounted below. Both tables slide easily to any



YOU KNOW YOUR MEASUREMENTS
ARE ACCURATE WHEN YOU USE THESE

Precision

SURFACE PLATES, ANGLES or CUBES

Made of Meehanite—an unusual wear-resistant material of dense, uniform grain structure—that assures a smooth, flawless surface.

The surface plates have an extra heavy top supported by scientifically designed ribs which give the plates absolute rigidity and extra strength to the entire surface—from the center to the very edge. Ample clamping space is provided.

The angles and cubes are made of the same material with the same precision.

Send for folder giving complete information regarding sizes and prices.

WHEELS

KNOBS

HANDLES

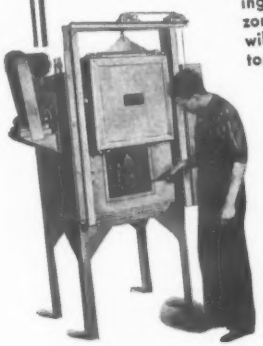
All are available in most popular sizes. Immediate shipments can be made from our extensive stocks.

MACHINE PRODUCTS CORPORATION
6775 EAST McNICHOLS ROAD • DETROIT, MICHIGAN

New Metals, New Processes Need
DESPATCH FURNACES

TEMPERING - DRAWING
TOOLS, DIES, PRECISION PARTS
also NON-FERROUS CASTINGS

Today there need be no heat treating bottlenecks. Despatch Horizontal Flow Tool Room Furnaces will speed heat treating to handle top production. Fast temperature changes reduce unproductive time to a minimum. Furnace uniformity of 5° F. is guaranteed thru the work chamber. See specifications to see why the Despatch Utility furnace will provide such speedy-uniform-economical heat treating for years of constant use.

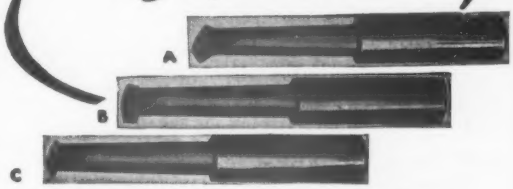


Accurate - Uniform - Flexible - Convenient - Speedy. Range 275° F. to 1250° F.

Write for Bulletin No. 83-T for complete information, specifications and prices.

DESPATCH OVEN CO.
MINNEAPOLIS • MINNESOTA

For efficient performance on high production



(a) For Internal Boring
(b) Facing and Bottoming
(c) Internal Threading

Made in wide range of sizes. (The small sizes shown above. The larger sizes come with cutting heads screwed securely to high-tempered shanks of special alloy.) Style A Boring Tool will outlast six normally-forged tools. Style B specially suitable for use on turret lathes and automatics. Especially adaptable for recessing. Style B has advantage of cutting cleanly a wide range of different threads in smallest borings imaginable. Also available with carbide tips.

Send for Catalog A-1139 for detailed information.

BOKUM TOOL COMPANY
49 W. HANCOCK AVE., DETROIT, MICH.

Hammond 10" Tool Grinder

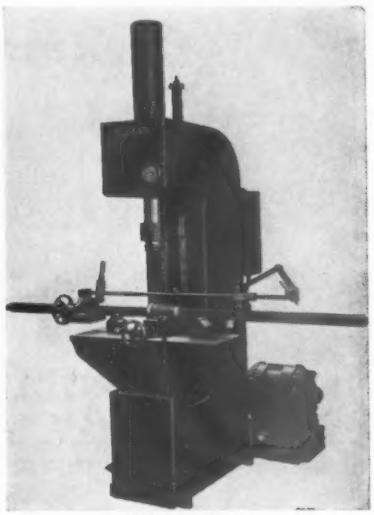
point of adjustment on machined ways, locking in selected position with a turn of the handle. Tables are slotted to accommodate the protractor angle-guide furnished with the machine and are grooved to keep the working surface free from grit and dirt.

The table on the right is mounted on a heavy supporting shaft, directly over a casting which serves as a sludge pan. The entire unit may be removed easily from the shaft permitting cleaning of the pan or replacement of wheels.

For wet grinding with diamond cup wheel, the right side of the machine can be fitted with a reservoir mounted directly over the wheel on the cast-iron guard. Drip-feed of moisture to the diamond wheel is controlled by a needle valve.

OILGEAR GOOSENECK PRESSES (F67)

Several new styles of Gooseneck Presses, in capacities from 6 to 25 tons, with controlled ram pressure, speed and



Oilgear Press
For stamping, broaching, etc.

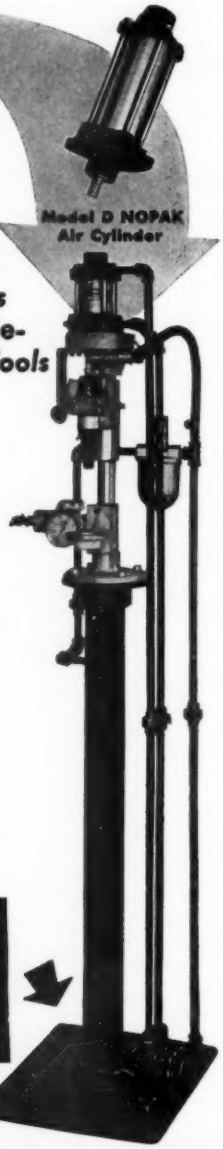
travel for fast, easy and accurate forcing, stamping, broaching, assembling, etc., are announced by the Oilgear Co., 1312 West Bruce Street, Milwaukee, Wisconsin.

These presses are made with plain platens, or lower platens as shown, arranged to receive detachable tables or fixtures. Each press consists of a rigid, all steel welded frame with integral pump and motor reservoir base; a ring type piston closely fitted to a honed steel cylinder; a large ground and polished ram guided in a long bronze liner; built-in direct reading pressure gage; molded ram packing; enclosed control mechanism; etc.

Rifle barrels of varying lengths and diameters are straightened on the Oilgear 15 ton type PGRF press as shown in the photograph. The spring balanced bar carries the two overhanging brackets which support the barrel slightly above the resistance blocks. Both brackets are needle bearing roller equipped and connected through a rod for convenient movement of barrel to right or left. Rifle barrel is deflected against two resistance blocks and the amount of deflection limited by a hand operated wedge type stop.

***Maybe* YOU don't need Pneumatic Screw Drivers**

. . . but this one illustrates how *NOPAK Valves and Cylinders* may be used to meet urgent demands for *Special Production Tools*



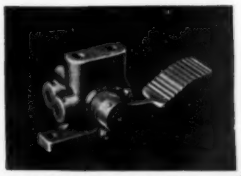
A "dust explosion" hazard in a certain plant made it necessary to develop a battery of screw drivers with spark-free motors and friction-free mechanisms. Air powered, air controlled, screw drivers solved the problem quickly, economically, efficiently!

Though *specially built,* these machines were made up largely of standardized units mounted on a simple base and pedestal. A standard Model D NOPAK Cylinder provides the vertical movement. A standard NOPAK 4-way, Foot Operated Valve provides precision control. Other "ready made" units are the Air Turbine for rotary power, Pressure Gauge, Lubricator, standard shafting and piping.

Here, then, is a new tool, developed with a minimum of new patterns, new castings, new stampings — without costly delays for special production. Similar applications of NOPAK Valves and Cylinders may help you lick a defense "bottleneck" in your plant.

Write for suggestions and literature.

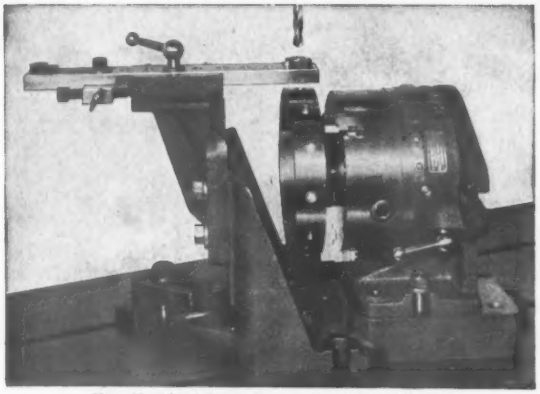
GALLAND-HENNING MFG. COMPANY
2757 S. 31st St. • Milwaukee, Wis.
Representatives in Principal Cities



NOPAK 3- and 4-Way Foot Operated Air Control Valve

NOPAK VALVES and CYLINDERS
DESIGNED for AIR or HYDRAULIC SERVICE

DOING MUCH RADIAL DRILLING?



New Hartford Super-Spacer Supplemental Base

● If you haven't a Hartford Super-Spacer in your shop—investigate, promptly, its many money and time saving advantages. If you already have it, then get the facts on this optional accessory, brand new, a real adjunct in many troublesome jobs—particularly where much radial drilling is being done. This new tool completes a wide range of jobs possible with the Super-Spacer, reduces set-up time to almost nothing, handles wide variations in both diameter and length.

Write for Further Details

THE HARTFORD SPECIAL MACHINERY CO.
HARTFORD, CONN.

FOR SALE

A

GOING BUSINESS

●

Has on hand orders and materials

●

PUNCH PRESSES

THREADING MACHINE

DRILL PRESSES

SMALL TOOLS

●

Located at Pinckney, Michigan
(50 miles from Detroit)

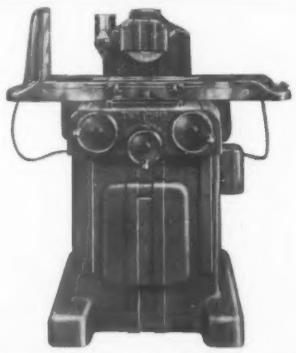
Inquire of

THE TOOL ENGINEER
Box 719,
2842 W. Grand Blvd. **Detroit, Mich.**

The No. 1

TAFT-PEIRCE

PRECISION SURFACE GRINDER



For increased precision on small parts, gages, and tools.

TRADE T P MARK

Write for New Bulletin

The TAFT-PEIRCE MFG. CO., WOONSOCKET, R. I.

WELDON ROBERTS

Brightboy

REG. U.S. PAT. OFF.

A TIME-SAVER IN DEFENSE INDUSTRIES

Soft Rubber
Wheels
Discs
Tablets
Sticks

for POLISHING and FINISHING METALS

The SOFT RUBBER binder CUSHIONS the abrasive

The product of a thousand uses. Speeds up finishing and polishing after grinding and abrasive operations. Nothing like it! Clean, easy to handle. Leaves a bright, smooth surface.

Prompt Deliveries — Order from your mill supply house.

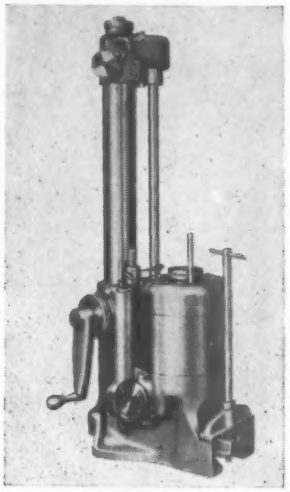
BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO., NEWARK, N. J., U. S. A.

STERLING MECHANICAL SANDER (F68)

The Sterling Tool Products Co., 363 E. Ohio Street, Chicago, Illinois, has developed a sanding machine which has the sanding block mounted on rubber rolls. This makes it possible for the operator to sand either flat or curved surfaces, greatly increasing the utility of the machine. The sanding block alternates at the rate of 3,000 five-eighths inch strokes per minute, simulating hand-sanding action. It is arranged so that any grade or size of abrasive can be quickly slipped in place, ready for use, and a standard 9 by 12 abrasive sheet furnishes three pieces the proper size to fit the sander. Because of the efficiency of the machine, there is a considerable saving in abrasive costs for the grit, even when worn down, will not substantially reduce the cutting action because of the speed at which the sanding block travels.

VAN NORMAN PER-FECT-O BORING BAR (F69)

The Van Norman Machine Tool Co.



Boring Bar
Now available to industry.

announces that the Per-Fect-O boring bar is now available to all the metal-working industries. This boring bar can rebore engine cylinders to accurate size in one cut, it is said, without any need for second cut or honing.

They are said to offer speed and accuracy in boring all grades of cast iron, brass, bronze and aluminum. Bars are easy to set up and operate, for all six models are portable and can be taken to the work or mounted on fixtures for continuous production. Automatic shut-off frees operator for other work while the bar is running. Noteworthy feature is the solid support given to the single fly-cutter by the four non-revolving, expansible and contractible supports that center the bar, then provide a steady rest all the way down, preventing chatter, vibration, weaving and taper, and assuring an accurate cut the first time.

MACHINE PRODUCTS SURFACE PLATES (F70)

Surface plates that resist deflection under load and retain their accuracy due to a special form of ribbing that

Surface Plate
For precision work.

supports them, are now in use by several manufacturers, announce the Machine Products Corporation of Detroit.

The sturdiness and rigidity essential to precision work exists over the entire area of the surface from center to edge.

handles *flush* riveting

AIR SQUEEZE ACTION plus AUTOMATIC FEED RIVETING for AIRCRAFT PRODUCTION

the new

Air Powered

RIVITOR

it's fast

1600 riveted joints per hour with no manual rivet handling. This is an average figure. Increased or lowered production depends on the ease with which the work can be handled.

it's simple

therefore economical to maintain.

write for

particulars to The Tomkins-Johnson Co., 624 North Mechanic St., Jackson, Mich.

this is a **TOMKINS-JOHNSON** *product*

LINK SPRING TESTERS

For Compression, Tension, Torsion, Flat and Special Shaped Springs

Hand Operated Testers

for service, laboratory and inspection spot testing. Dial Indicator and Electric Signal equipment available for close reading. Electronic Control equipment available for automatic indication of results.

Motor Driven Testers

for Production Testing. Available with Electronic Control to eliminate reading of dials and gages by operators. Results automatically indicated by flash of neon lamps.

Tester illustrated is Model PB4-250, with Electronic Control.

LINK ENGINEERING CO.

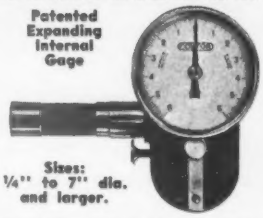
13842 ELMIRA STREET DETROIT, MICH.

"We're finding this out TOO LATE!"

Give operators COMTORPLUG and keep down costly rejects

No gaging skill needed to gage to fractions of .0001" with COMTORPLUG

Patented Expanding Internal Gage



Sizes: ¼" to 7" dia. and larger.

Rapidly growing is the practice of arming machine operators with Comtorplugs. These automatically accurate gages show up the smallest irregularity—not just size, but front and back tapers, out-of-round, bell mouth, barrel shape, etc. Seeing this to a fraction of a ten-thousandth, the operator checks tendencies toward off-size BEFORE they get outside the tolerance. Investigate this gage, widely used by operators and inspectors on airplane, ordnance, automotive, electrical and other precise bores.

Request Bulletin 27

THE COMTOR CO.

70 RUMFORD AVE. WALTHAM, MASS.

BIG-HED LOC-KEY-SET

Loc-Key-Set (Pat. Pend.)

A positive non-turning (locked) set, that with oversize wide-shouldered head gives a permanently rigid tool in all rotated positions. Permits use of all cutting edges and increases tool life. Correct head design gives ample clearance for cutting point with maximum tool clearance and permits most effective tool approach.

(Pat. Pend.)

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EXECUTIVE OFFICE 938 E. 41ST ST. CHICAGO, ILL. Phone Atl. 1095 SHELDON M. BOOTH, PRES.

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WILL SHIP ON 30 DAYS' TRIAL

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- No honing.
- Will not chatter.
- Chrome-like finish.
- Perfect alignment.
- Full bearing surface.
- Left and right spirals.
- 50 to 80 thousandths expansion.
- Cannot fall in slots or oil grooves.
- Extension pilots for line-up work.

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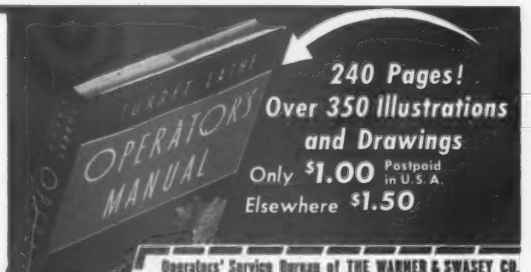
Send for the New TURRET LATHE OPERATOR'S MANUAL

Offered as the Most Authentic and Complete Text Book on Turret Lathes and Turret Lathe Operation

Every man interested in metal turning—old-timer, learner, apprentice, student—can improve his knowledge and handle tooling setups and metal turning jobs more effectively after reading this authoritative volume. Written expressly for shopmen by men who have spent the greater part of their lives in building, operating, and improving turret lathes and turning methods. Easy to read. Easy to understand. Covers all phases of metal turning. Explains methods. Suggests short cuts. Contains tables on feeds, speeds, tool angles, threads. **A de luxe edition sold far below cost by America's largest manufacturer of turret lathes.**



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[G]

The plate is made of a specially processed iron of uniform texture, strength and solidity through all sections, it is said. A special heat treatment is given the iron to relieve casting and machine strains. This prevents distortion and changes from taking place after the surface has once been scraped. After being scraped, the surface is checked against plates of known accuracy.

JEFFERSON SWING FRAME GRINDER (F71)

The Jefferson Machine Tool Co., Fourth, Cutter and Sweeney Streets, Cincinnati, Ohio, announce a new swing frame grinding and polishing machine for wheels up to 14 inches in diameter.

Full universal can be swung forward and backwards, up and down, right and left, and at any degree of angle or twist at the spindle head. Twist motion joint can be instantly set at any tension or locked in any position permanently if desired by turning handle as shown under motor carriage. It will take up to 14 inch x 2¾ inch grinding wheels, or 14 inch x 3 inch buffing and polishing wheels. Spindle is of high carbon steel, 1¾ inches in diameter, running 2100 RPM in high grade precision ball bearings. Double V-belt drive. Spindle will

Swing Frame Grinder
With full universal.

receive up to 14 inch times 3 inch buffs, or 14 inch × 2¾ inch abrasive wheels having standard bore 1¼ inches. Stretch in belts can be taken up readily by an adjusting screw in the head. Tension of belts remains constant in any position or angle of machine. Motor is 3 H.P. fully enclosed. A.C. ball bearing motor 220 volts, 3 phase, 1750 RPM with 6 inch diameter pulley for V-belts.

IDEAL GRINDING WHEEL DRESSER (F72)

A new abrasive wheel type grinding wheel dresser that is said to give a cutting and truing effect almost equal to that of a diamond, has been introduced by the Ideal Commutator Dresser Co., 5074 Park Avenue, Sycamore, Illinois.

The cutting wheel is held in a protective metal housing which deflects the grindings away from the operator. A large handle makes it convenient to hold and use. The cutting wheel is replaceable when necessary.

Besides general cleaning and truing of a grinding wheel, other uses include the truing of cut-up and uneven sides, dressing out deep grooves and out-of-roundness, restoring out of balance wheels into true rotating ones. It can also be used to shape wheels into different forms when form grinding is desired.

DURAKOOL MERCURY SWITCHING (F73)

Durakool, Inc., of 1010 N. Main Street, Elkhart, Indiana announces a new method of double flow mercury switching for use in factories or any place having vibration. This new invention cures entirely or aids materially under these circumstances, it is claimed.

SKILSAW TOOLS
speed up production in this busy defense plant!
EVERY kind of Skilsaw Tool is used on all these operations to get work done faster!
Swift, easy cuts in 16-ga. channel steel are made with SKILSAW and a friction blade
Skilsaw Model "O" Disc Sander smooths down welds faster. Also sands, buffs, prepares for finishes.
Skilsaw Model "SL" Disc Sander speeds up all grinding, metal cleaning, filing, surfacing on castings.
Skilsaw Zephyrplane Belt Sander swiftly removes scale and grit from metal oven wall.
Faster drilling is easy—even in close quarters—with compact, rugged Skilsaw Model 43 Drill.
Famous Skilsaw Model 80 Drill—quickly drills holes for handles on laminated, insulated doors.

SKILSAW TOOLS

MEAN SPEED . . . and America *demands* speed in a plant working 95% on direct defense orders! That's why this busy factory (name on request) uses every kind of SKILSAW TOOL to save more time on more operations, to speed deliveries of Army and Navy bakery equipment, to hasten America's vital defense.

Are you making deliveries on schedule? Are there jobs in your plant that should be done sooner? Those are the jobs that could be done faster . . . with SKILSAW TOOLS. Call your distributor now for a convincing demonstration.

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SKILSAW PORTABLE ELECTRIC TOOLS
YOUR DISTRIBUTOR WILL GLADLY DEMONSTRATE THESE TOOLS ON YOUR OWN WORK

Tool Making Holds Many Interests Not Fully Known!

As all files by style
And by nature file,
All our Cutters gear
To the cuts they "shear".

Their design and make grade their "Ground-tooth's" rake; and their increased speed helps results to lead. Now the very best, that is known by test, brings a smile to costs by "Deburring" loss. Severance restarts, where the old departs, for "Regrinding" rears what was scrapped for years.

So investigate what all Pasts relate; do not take our word—let the facts be heard. Engineering skill and our service still play a potent role where our Cutters stroll. As our work expands to meet all demands, we can say to you that delays are few.

To users of Rotary Files:
"There is no shortage in the Midget Milling Cutter Field of standard shapes and sizes."

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1522 East Genesee Avenue
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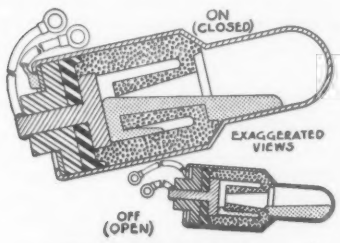
MANUFACTURERS of Midget Milling Cutters, "Ground from the Solid after Hardening"—"Chatterless" Countersinks—Tube Deburring Cutters—and Special Tools. Also, "Regrinding Service" which enables the average Midget Milling Cutter to do the work of ten ordinary Rotary Files. Users and Prospects on the Pacific Coast may address our Western Branch at 3844 South Santa Fe Avenue, Los Angeles, California.

REGRINDING CONSERVES STEEL

——NEW EQUIPMENT——

Two tails of mercury pulling in opposite directions, over a ceramic barrier



Double-Flow Switching
Two tails of mercury.

until severed, prevent double contacting where vibrations exist. When closing, the two approaching bodies of mercury pile up a double thick electrical conductor. Double flow operates either as a slow rolling motion or equally well on a high speed mechanical snap action.

CRAMER TIME RELAYS (F74)

The R. W. Cramer Co., Inc., of Centerbrook, Conn., announces new RS1C and TD1C time relays which have a wide application for the automatic control of industrial process and machine operations which must be time controlled or for electrical circuits where a time delay action is required.

These relays are synchronous motor operated timers which either keep an electrical circuit closed for a preset time interval or, in the case of the TD1C, can be used as time delay relays which when energized keep a circuit open for a selected interval. The timers have an instantaneous reset feature and when restarted they repeat the timing without manual resetting. They are available with inbuilt manual start button or can be supplied for remote control start button. Auxiliary contacts can be furnished, for instance, for audible or visual signal circuits.

Two cup shaped fine toothed clutch members are actuated by a small electro magnet, the armature of which carries a leaf spring which serves as the actuating member. This assembly is carefully counterbalanced with a second spring to absorb all shocks.

A micrometer adjusting knob with a fine worm gear moves a pointer across the dial at a slow rate. Due to the visibility of the whole scale and the knife-edge pointer, accurate settings of the timer can be made with little effort. Minor changes are accomplished with facility, it is said. An additional pointer, mounted on the control shaft, rotates with the switch operating member and

DoALL

Punch Frames of hot rolled steel cut in 30 minutes with ⅜" DoAll Saw (41 lineal inches). McHugh Bros., Rockford, Ill.

ACE OF BAND SAWS
FULL SPEED AHEAD!

Without an argument, these efficient little metal eaters will go to work on any kind of tough metal up to 10" thick and turn out a job to be proud of in better-than-record time.

And—you should see their smooth performance on some of the hard ones like cold rolled nickel, laminated low carbon sheet steel, Neoprene, aluminum alloy, bronze, semi-steel castings, etc.

42 STANDARDIZED SIZES

DoAll Band Saws come in Raker tooth, heavy set, A temper—in every size approved by the OPM Ruling—each one the last word in saw perfection.

DoAll Saws do expert internal and external cutting on all kinds of die parts at Koller Die & Tool Co., Milwaukee, Wis.

Shows how 40 to 60 metal sheets are clamped together and cut at one time with a DoAll Band Saw.

FREE BOOKLET

"Actual Performance Records of DoAll Saws" is well worth your reading. It's short and to the point. Send for copy.

DO ALL SAWS

THE DOALL COMPANY
1211 Thacker St. Des Plaines, Ill.
Associated with Continental Machines, Inc., Minneapolis, Minn.

shows at all times how much of the cycle has elapsed or the time it takes before the switch trips.

The contact of the RS1C or TD1C timer can be operated manually at any time by turning the micrometer setting knob until the operating lever operates the switch unit.

DIA-TOOL DIAMOND WHEEL DRESSERS (F75)

Dia-Tool Inc., of 320 Yonkers Avenue, Yonkers, N. Y., announces three series of diamond wheel dressing tools. The matrix used to hold the diamonds consists of regularly sintered tungsten carbide. The bond between the tungsten carbide matrix and the diamonds is said to be so strong that it is virtually impossible for the diamonds to become loose.

Diamonds in the series A tools are all hand set and equally spaced from each other throughout the matrix down to the steel shank. Thus no matter where the dresser is brought in contact with the grinding wheel a sharp diamond point will expose itself to do the dressing operation. Diamonds are selected for size so that no inferior or too small stones can hinder the tool performance. Series A dressers give the assurance that the last bit of diamond material can be used up without loss, it is said.

Series B dressers have only one diamond imbedded in a tungsten carbide matrix. Diamonds up to three-quarter carats can be used up without resetting. Larger diamonds can be reset to good advantage. Dressers of any special design are manufactured under series C.

FEDERAL SHELL GAGE (F76)

A Federal Comparator gage for the checking of .37 MM anti-aircraft shells is being manufactured by the Federal Products Corporation, 1144 Eddy Street, Providence, R. I. With this gage it is possible for the inspector to determine both whether the shell dimensions meet the requirements or not, and also how far out imperfect shells may be.

The shell rests on Roller V Blocks which can be rotated to compensate for wear. The shell is located laterally by adjustable stop screw. A gage of this same type is made for shells of any size. The gage is entirely mechanical and independent of all electrical or air line connections.

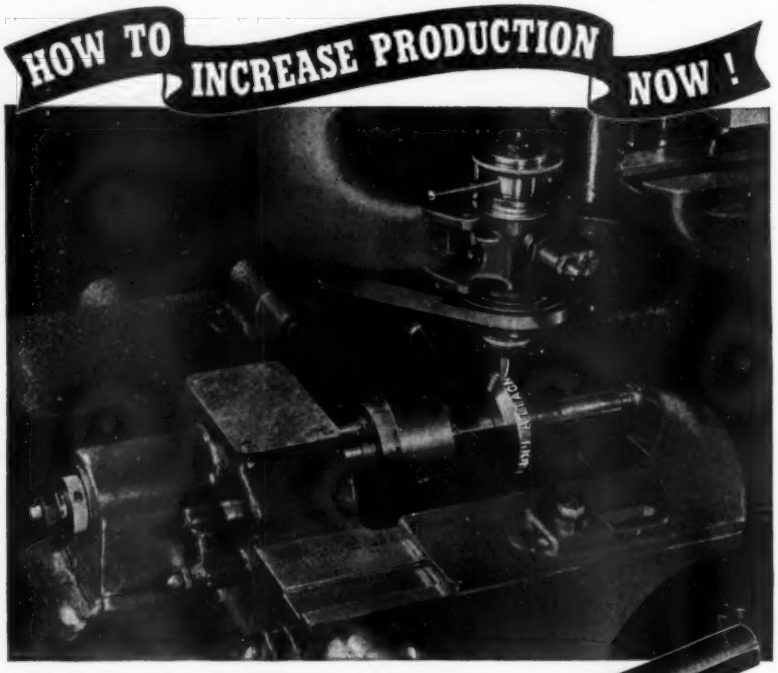
This gage is equipped with five Federal Indicators mounted on an adjustable bracket to check shells for diameter and concentricity simultaneously.

UNIVERSAL CENTERING CHUCK (F77)

The Universal Engineering Company in Frankenmuth, Michigan, has recently announced a new floating chuck designed especially to operate in a horizontal position in automatic screw machines and turret lathes.

By means of adjustment, the weight of the various tools can be counter balanced and in this manner increased feed can be used with a chuck of this kind, without the danger of marring or causing bell mouthed conditions. The construction is such that the spring pressure is from four different directions and can be increased and decreased in any direction by means of the adjusting screw.

These chucks use a ball bearing drive both for the lateral movement and for thrust. Floating chucks are useful for drilling, counterboring, reaming, and for any tool where piloting from the lead hole is required. There is no dog-tail motion, it is claimed, as this chuck operates in the same vertical plane at all times.



ON ROLLS, KNURLS, DIALS

. . . also on numeral wheels, scales, embossing dies and other round engraving work from flat masters—without a forming guide.

GORTON ROLL ATTACHMENTS can be quickly mounted on Gorton Pantograph machines. Reproduce accurately, completely around rolls of sizes up to 12″ in length and 6″ in diameter. (Special equipment for rolls up to 18″.)

ONE SIMPLE ADJUSTMENT sets the Roll Attachment to accommodate infinitely varying diameters of rolls.

QUICK DELIVERY—Gorton Roll Attachments are available for delivery within four weeks.

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If you have any problem of roll engraving send us full data on the parts. Our engineering department will be glad to study your jobs and make recommendations — no cost or obligation.

GORTON

GEORGE GORTON MACHINE CO.

1322 RACINE STREET, RACINE, WISCONSIN, U. S. A.

DENISON HYDRAULIC PRESS (F78)

To correct irregularities of a few thousandths of an inch in short, hardened steel shafts is a tough job reported to be accomplished by the special tooling of a standard 15-ton, C-type Denison Hydraulic press, announced by The Denison Engineering Company, Chestnut and McCony Streets, Columbus, Ohio.

With the ram of the press raised, a shaft is fixed between centers. Gages, calibrated in thousandths of an inch, are moved along the shaft until they indicate a point where straightening is needed. Then the press ram, operated by the control lever, is advanced to the shaft and centers are lowered with the shaft to the straightening block. Additional movement of the control lever applies the tonnage that straightens the shaft.

The gages measure the shaft after tonnage has been applied, and before the shaft is released. They work swiftly, it is said. Feather-light pressure on the operating lever controls the movement of the ram, and the tonnage applied is in direct proportion to the movement of the lever.

Conveyor Lines Simplify Production

More than a mile of conveyor lines simplify and expedite materials handling and assembling operations in the revamped and expanded Cleveland Lighting Division of the Westinghouse Electric and Manufacturing Company. In order to double the rate of production as a result of increased defense orders, it was necessary to completely revise the existing plant layout, using roller, belt, and monorail conveyors to tie in with increased production facilities provided by a new two-story manufacturing and storage building.

Despite the fact that one end of the factory had to be exposed to permit new construction, both production and construction proceeded on schedule, and there were no delays in deliveries on account of the expansion. This was accomplished by temporarily turning the new pattern storage building into an assembly department, and five assembly lines were set up to turn out 500 fluorescent fixtures per eight-hour shift.

Due to space limitations and available transportation facilities, most efficient production is realized by establishing a "C" shaped material flow layout. Overhead and roller type conveyors are used to move the parts going through various stages of assembly.

"AMERICAN" broaches "Take it" CAN

AMERICAN BROACH & MACHINE CO.
ANN ARBOR, MICHIGAN, U.S.A.

AIRCRAFT RIVET HOLES BY THE MILLIONS ARE BEING PUNCHED WITH WALES PATENTED SELF CONTAINED DIES

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THERE MUST BE A REASON!

FOR FURTHER INFORMATION WRITE
THE STRIPPIT CORP. 1200 NIAGARA ST., BUFFALO, N. Y.

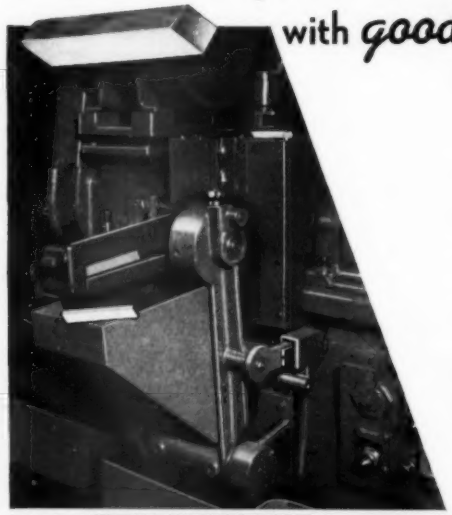
NEW LITERATURE . . . . . .

Of Interest to the Tool Engineer

(290) Gage Blocks
Hoke & U.S.A. Precision Gage Blocks. 20 pp. Pratt & Whitney, West Hartford. Connecticut. This is a new booklet, well illustrated, on Pratt & Whitney Gage Blocks.

(291) Resistance Welding
Resistance Welding Data Book. 79 pp. P. R. Mallory and Company, Incorporated, Indianapolis, Indiana. This second edition deals with the theory and practice of resistance welding. The four sections deal with fundamentals of resistance welding, materials to be welded, alloys for resistance welding applications and miscellaneous tables.

Improved *finish* and *accuracy*— with *good production!*



PRACTICALLY all tool bits are being ground today — the direct result of a definite demand for better accuracy, as well as improved finish.

This Gardner No. 120A — 20" Double Grinder, carrying an hydraulically-oscillating swinging arm, on which is mounted an indexing type of fixture, does an excellent job on this class of work. One, or two, pieces are clamped at one setting (depending upon size), and the operator loads one side of the fixture while the other is between the wheels.

PRODUCTION: 60 to 120 tool bits per hour, complete on 4 faces. Tolerances: .002" for squareness, parallelism and uniformity.

This type of GARDNER GRINDER is adapted to many other parallel-surface parts—

WRITE FOR FULL DETAILS!

GARDNER-GRIND YOUR *Flat* SURFACES

GARDNER MACHINE COMPANY

442 East Gardner Street • • • • Beloit, Wisconsin, U.S.A.

(292) Heat Treating
Furnaces for Armament. 8 pp. Lindberg Engineering Co., 2450 W. Hubbard St., Chicago. This pamphlet describes how Lindberg equipment has been put to work in the aircraft and armament industries.

(293) Machine Tools
Walker-Turner Machine Tools. 56 pp. Walker-Turner Co., Inc., Plainfield, N. J., A new revised catalog, illustrated, explaining in detail the standard line of metal working and wood working machine tools made by this company. A number of new machine tools developed primarily for the defense industries such as a unique radial drill press, two polishing lathes, and a radial machine for cutting ferrous and non-ferrous metals, plastics and ceramics, are also shown.

(294) Arc Welding
Hobart "Simplified" Arc Welding with Multi-Range Dual Control. 35 pp. Hobart Brothers Co., Box TE, 111, Troy, Ohio. This catalog, attractively illustrated in color, describes the complete line of Hobart "Simplified" Arc Welders and Accessories.

(295) Machinery
Machines for Milling, Broaching, Die Sinking, Grinding, Lapping. 44 pp. The Cincinnati Milling Machine Co. and Cincinnati Grinders Incorporated, Cincinnati, Ohio. Publication No. M-995. This booklet contains illustrations, brief descriptions and specifications of all Cincinnati current design machines.

(296) Powder Metallurgy
Durex Iron, Another Milestone in Powder Metallurgy. 6 pp. Moraine Products Division, General Motors Corporation, Dayton, Ohio. This bulletin discusses the use of powder metallurgy in the production of bearings, gears and cams, and miscellaneous metal parts.

(297) Metallurgy
Fatigue of Metals, Some Facts for the Designing Engineer. 45 pp. The Nitralloy Corporation, New York, N. Y. An introduction, chiefly intended for the designing engineer, to the study of the conditions which limit the stress in metals by fatigue.

(298) Sleeve Bearings
Handbook of Sleeve Bearings, by Albert B. Willi, chief engineer, Federal Mogul Corporation, Detroit, Mich. 216

BALDOR
BALL BEARING GRINDERS
for accurately sharpening
CARBIDE TOOLS
1-YEAR GUARANTEE

BALDOR CARBIDE TOOL GRINDER is precision-built for accurately and quickly sharpening Carbide Tools. Sturdy ½ H.P. heavy duty, ball-bearing, reversible Motor. Large adjustable tool-rest tables. Satisfaction guaranteed.
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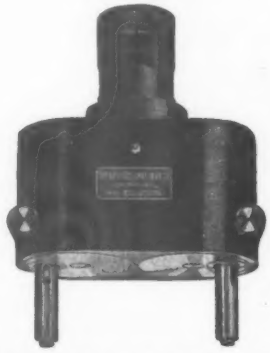
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All Types of Fixed Center Heads
UNITED STATES DRILL HEAD CO.
Cincinnati, Ohio

—NEW LITERATURE—

pp. This book discusses the effect of design, alloys and manufacturing methods upon sleeve bearing efficiency, and defines the field of application for each basic type of sleeve bearing. It contains information for the engineer,designer, and draftsman on the selection, design and application of sleeve bearings and bushings; both plain and flanged, full round and split.

(299) Tungsten Carbide Tools

Manual on Tungsten Carbide Tools, The Carboloy Co., Inc., 11145 E. 8 Mile Ave., Detroit, Mich. This manual (GT-133) covers the design, brazing, use and maintenance of carbide tools, also the design and setting of tool holders, machine recommendations, tool holder screws, etc.

HOW TO ORDER

Booklets listed in this department and identified by a key number preceding the heading may be obtained by using the postcard on page 97. No postage is required.

(300) Screws

Mac-its. 32 pp. The Strong, Carlisle & Hammond Co.,1392 West Third Street, Cleveland, Ohio. This catalog includes complete factual data, arranged in a practical and convenient reference form, as to the physical and use characteristics of Mac-it Screws, list prices, shipping weights, together with pertinent engineering information.

(301) Transformers

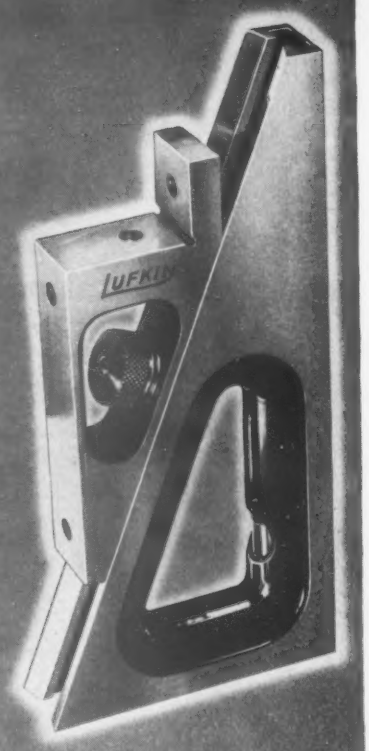
Constant Voltage Transformers. 21 pp. Sola Electric Co., 2525 Clybourn Avenue, Chicago, Illinois. Bulletin No. CV-74, just released by this company, gives full details on the Sola principle of constant voltage output for industrial operations requiring exact line loads. Electrical and mechanical specifications on the entire line of Sola transformers are included.

(302) Tapping Fixtures

Holding Fixtures for Haskins Tapping Machines. 12 pp. R. G. Haskins Co., 2756 W. Flournoy St., Chicago, Illinois. This new illustrated bulletin shows the complete line of Haskins tapping fixtures. The air operated fixtures and the piece part control fixtures are described in detail. Other fixtures of a simpler design are also shown.

(303) Lathe Grinders

Care and Operation of Portable Precision Lathe Grinders, by Fred O. Orthey, application engineer. 19 pp. The Dumore Co., Dept. 221-K, Racine, Wisconsin. This instructive booklet

LUFKIN
MASTER PLANER GAGE

The design and precision building of the Lufkin Master Planer Gage make it not only a better Planer Gage, but fit it to many other jobs for which ordinary gages are unsuited. You truly get more than a Planer Gage when you buy a Lufkin. Let us send you a copy of our general catalog and show you why.
LUFKIN
SAGINAW, MICHIGAN • New York City
TAPES . RULES . PRECISION TOOLS

deals with such subjects as selecting the grinder, the proper quill, and the proper wheel; setting up the grinder on the lathe; dressing the wheel for precision grinding; and many others.

(304) Plug Gages

Dublife Plug Gages. 12 pp. Bulletin Number 41. United Precision Products Incorporated, 4617 W. Huron Street, Chicago, Illinois. This is a complete new catalog on Dublife and AGD gages, giving descriptions and complete specifications.

NEW BOOKS

Tool Design by C. B. Cole. 498 pp. $4.50 American Technical Society, publishers, Chicago, Illinois. Written as a companion text to "Tool Making" by the same author, this book covers the same general field, but stresses the design of fixtures and tools rather than their making.

The book is illustrated with over 425 excellent illustrations taken from the production field. These drawings have been selected to cover a wide field, and study of these drawings alone will give an education in tool design.

"Tool Design" shows how to select or design proper materials, drills, reamers, milling cutters, boring bars, tool holders, tool blocks for turret lathes, reaming and facing machines, gages, and many others.

The author, Charles Bradford Cole, M. E., has had years of actual experience. As President of the Tool Equipment Sales Company of Chicago, he is engaged in marketing tools to supply metal manufacturing, and he has the opportunity of keeping in touch with the most up-to-date practices in this field of modern production.

Emergency Training for Essential Industries, a study made by six committees through a seminar at the Summer School of the Colorado State College. Fort Collins, 1940. 103 pp. $1.25 American Technical Society, publisher, Chicago, Illinois. This study is the result of the cooperative work of 36 men organized in six committees. Each specialized on some one subject or phase of the general problem of emergency training for essential industries. The study included both those men now employed in defense industries and those selected from public employment registers who by training will become qualified for employment in jobs essential to the National Defense Program.

Training for the first group is called "up-Grading"; for the second group, "refresher training." The information and suggestions in this report apply to both groups.

Instantaneous and Complete Control
OF PRESSURE BY FOOT PEDAL

one important reason why G-F-P PRESSES set so many production records

The G-F-P Press operator varies the pressure applied to the work from a few pounds to machine capacity by slight changes in pressure on the foot pedal . . . there are no levers, valves or switches to operate by hand. There is no fixed cycle through which the press must go . . . the ram automatically and quickly returns to its original position from any point of the stroke by simply releasing foot pedal.

The nearest office will gladly explain the many other features of G-F-P Presses that contribute to their amazing production records.

GENERAL MANUFACTURING COMPANY
6432 FARNSWORTH AVE., DETROIT, MICHIGAN

Chicago—John Morley Davie—4125 Belle Plaine Ave. • Cincinnati—George H. Diers—4807 Yarmouth Place • Cleveland—The Cleveland Duplex Machinery Co., Inc., Penton Bldg. • Detroit—McKee-Kenyon & Co.—1627 W. Fort St. • New York—Triplex Machine Tool Corp.—125 Barclay St.

GENERAL *Flexible* POWER PRESS

Stimson Sends Regrets

Mr. Clyde L. Hause, Natl. Sec.
American Society of Tool Engineers
Detroit, Michigan

Dear Mr. Hause:

I regret that pressure of work will make it impossible for me to accept your kind invitation to attend the meeting of the American Society of Tool Engineers on October 17 in Toronto.

The bonds of friendship and of peace between the Dominion of Canada and the United States have been unbroken for over one hundred years. In these days of peril, when all neighbors in the Western Hemisphere must draw closer together in the face of the common danger, activities like yours are worthy of especial commendation.

As one who in the past has labored to help cement the bonds of amity and esteem between us and our neighbor to the north, I send you my best wishes for a pleasant and fruitful meeting.

Sincerely yours,
Henry L. Stimson
Secretary of War

Handy Andy Says—

WHETHER absentee or among those present, you'll naturally want a review of the Convention, and, human nature being what it is, the Canucks may like to see themselves through an observer's eyes. Well, I'll try to be the Chesterfield boy and satisfy, although the portrayal will have to be a composite of short flashes. If you want formal presentation, read elsewhere; me, I'll dress my tale in workaday mufti. In plain language, the Convention was wonderful!—the best so far. The Canucks did themselves proud, reflected credit to King, country and their respective Chapters as well as to the entire A.S.T.E. Each member of the two Chapters — Toronto and Hamilton — seemed to have appointed himself a special reception committee with the single purpose in mind of extending an unforgetable hospitality to the visitors. And each succeeded. Thanks!

▼ ▼ ▼

Riding Torontoward, I am enjoying interesting scenery and lively conversation. And everywhere, a native friendliness and courtesy; Canada bids the visitor welcome, and means it. We were early impressed with the fact that Canada is at war and means to carry it to a successful conclusion. At hamlet, village and city, men in uniform, marching, drilling; the flower of Canadian manhood toughening for the ordeal to come. En route, a fugitive odor (was it natural gas?) stirred memory, and I innocently (?) began reminiscing about my grandmother's wonderful soup. So, we supped at Brantford a/c the others just couldn't wait 'til we got to Toronto. A wonderful appetizer, soup. Skirting Hamilton after dark, the town twinkled in the valley, and from there on the road was a bejewelled ribbon that, rainbow like, had its pleasant surprise at the end. Toronto is truly a beautiful city.

▼ ▼ ▼

Stretched legs on arrival, registered and looked around. First man I met was Arnold Thompson; the first lady, his gracious wife. Arnold was busy and weighted with responsibility, but had plenty of time to get visitors oriented. Me, I took a rather distinguished looking man in the offing for an English lord, but when I saw the A.S.T.E. badge and no monocle, I figured he could be

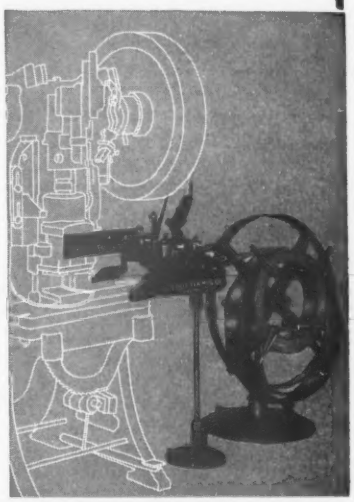
Increase Production WITH
WITTEK *Automatic* ROLL FEEDS AND REEL STANDS

for Any Make or Size Punch Press

Wittek Automatic Roll Feeds provide an improved and simplified method of punch press operation that insures rapid feeding under all conditions. Wittek Roll Feeds handle any type of coiled strip stock and are made in single roll, double roll, and compound types with straighteners, in models to feed in any of four directions.

Wittek Adjustable Reel Stands provide automatically expanding coil holders that center the coil and assure maximum production by eliminating looping, tangling and backlash of stock.

If your production problem involves feeding coiled stock to punch presses, it may be solved by consulting us. Your inquiry will be given immediate attention. Send for complete descriptive catalog.



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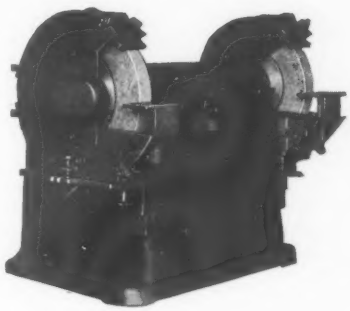
4307 W. 24TH PL., CHICAGO, ILL., U. S. A.

THE ★ MARSCHKE ★ LINE



TAKE TIME to investigate and specify the correct size, type and make of grinder for your particular requirements and you will solve many of your grinding problems. Your conclusions will point to Marschke Swing Frame or Floor Stand Grinders for most dependable, most satisfactory work.

Marschkes' smooth running spindles, multiple wheel speeds and many operating conveniences cut abrasive costs and spare the operator. Bearings are triple protected from the termite action of abrasive grit. Built to machine tool standards, they give extra years of dependable, trouble-free performance. ***The Bulletin of facts on 70 specifications of Marschke Grinders is yours for the asking. Write to***

VONNEGUT MOULDER CORP.
1820 Madison Ave.
Indianapolis, Ind.

braced for a light without a formal introduction. Righto! — we clicked at once. His name is Fred Schytte, and comparing notes, we found that we were born in the same province in Sweden. It's a small world, eh? Later, met a very distinguished looking lady whom, it turned out, he had selected as a life partner. But then, the Swedes are noted for their fine discrimination when it comes to women and, in that respect, have exerted a considerable influence on their associates. (Bert Carpenter, for one, spent some little time in Sweden.) Be that as it may, I saw more beautiful women in Toronto than I've seen anywhere at one time, although in fairness it must be said that some of them came from the States. And one came from Montreal . . . Ah, Wilderness! But then, I've Wilderness enow at home and a jug of wine and books of verse to boot. Still, one should be privileged to admire loveliness and, remotely, to revel in charm. *Que c'est bon de vivre! !*

▼ ▼ ▼

Up betimes Thursday and off on a plant tour, with thanks to Len Wiertz of F. F. Barbour Machine for liquid cheer at the luncheon. We'll remember you! As for the plants visited, there was an implication of secrecy that I'll not violate. But, the Canadians are really working. One plant, modern to the minute and admirably equipped, was turning out Boforsguns—and may Hitler's cohorts feel their sting! There seemed to be a preponderance of women operating the machines, and they impressed me as a middle class type doing their bit for England and Dominion. There was no "soldiering" on the job, no slowdowns of the sort that have so deplorably retarded the American defense program. Slowdown, incidentally, is termed loitering in Canada and, being tantamount to sabotage, is discouraged.

▼ ▼ ▼

Yes, we can learn from the British, especially the Scots. I was talking to S. D. Shaw of Shaw Tool and Machine (Toronto) and he waxed reminiscent over his cocktail. When a lad in the Hi'lands and, naturally, interested in Scotland's most publicized industry (adequately sampled during the Convention) he learned a trick that, if copied down in Ol' Kaintuck, would project hillbilly moonshine into the realm of Big Business. No camouflaged bosky tod for the canny Scots, nae sir! They put their stills in the open among the braes, like honest men, but run the smoke pipes into the burns (brooks to you) and the water just carried smoke and odor doon th' hill and ne'er a sign or clue for the revenue men. Ay, mon, they're braw laddies, them Scots.

▼ ▼ ▼

There were just too many at the Convention to mention names, except at random. As usual, one greeted old friends casually, the while one as eagerly sought them out. What's six months more or less to the Tool Engineers, except to resume an interrupted conversation? Met A.S.T.E. Attorney General Bob Lippard who, incidentally, has yet to miss a convention, and Gene Bouton and Lou Webber, and I had a glimpse of King Cole's silver mane bobbing in a sea of heads, some sans mane. Exchanged greetings with Ed Hall and Earl Johnson and sent greetings to Minnesota with Mr. Swenson. Walter Wagner was there, all business, and Clif Ives, who takes his O.P.M. deputyship quite seriously and who is admirably fitted for his job. A talk with Clif, and one's confidence in the men in charge of the American defense program soars to new heights. Also, committeed a while with Irwin Holland and John Lindegren, the three of us comprising the Editorial Committee, although mine is a comparatively minor role by now.

Met a Major Cayouette whom I first took for a brass hat but who is really a

SPEED-UP PRODUCTION— LOWER COSTS

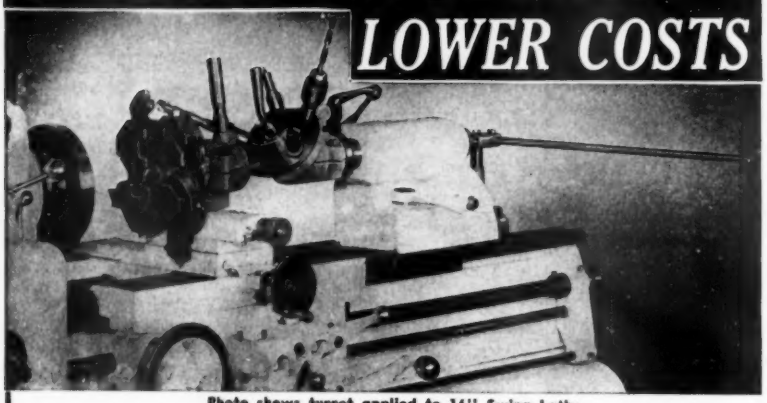
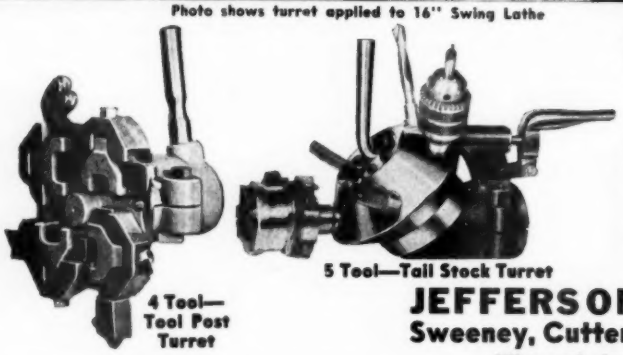


Photo shows turret applied to 16" Swing Lathe



4 Tool—Tool Post Turret

5 Tool—Tail Stock Turret

CONVERT ENGINE LATHES

Here's a quick and economical method of converting your engine lathes into complete, accurate turret lathes—by installing the Jefferson Tail Stock Turrets, the Jefferson Tool Post Turrets and the Jefferson Adjustable Pull-Feeds.

These sturdy, precision attachments have in many cases made it possible to double productive capacity — because nine different tools are quickly available at all times — independently or collectively.

Any kind of work may be done quickly and efficiently—forming, roughing, boring, finishing, knurling, drilling, tapping, etc., without stopping lathe or changing tools.

DELIVERY 10 DAYS

Jefferson Turrets are real production tools—substantial, rigid, accurate and adaptable to any size or make of engine lathes. They must not be confused with the small makeshift gadgets now on the market.

We also manufacture Belt Sanders, Swing Frame Grinders, Gyratory Foundry Riddles and Milling Machines. Let us mail bulletins giving full details.

JEFFERSON MACHINE TOOL CO.
Sweeney, Cutter and Fourth Sts. Cincinnati, Ohio

When ordering new lathes, be sure to specify Jefferson Turrets.

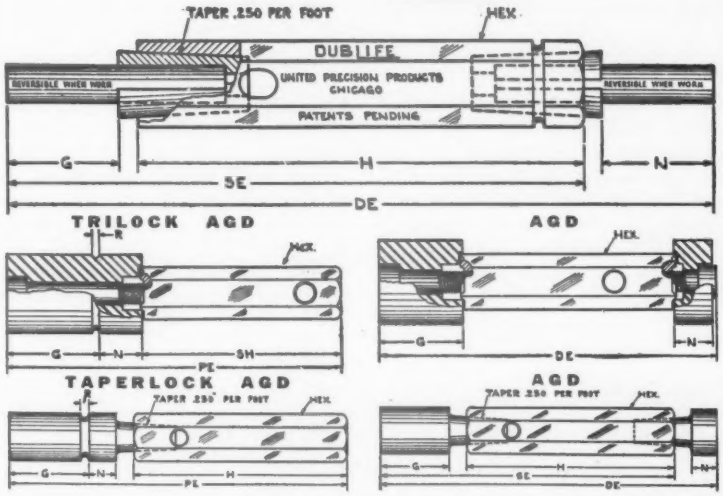
—HANDY ANDY SAYS—

highly qualified Tool Engineer; later, hobnobbed with a "Lady from Hell." Regular fellah, he was. I put down a lot of names which I can't read now, but I'll blame that on the high seas of Scotch, the ship rolling something awfu' after a while. Let's see now . . . oh yes! Geo. Whitehouse bought himself a Scotch ham??? No, it must have been a tam, because he wore it. Had a snack with E. A. Doogan at Murray's, where I talked Swedish to a group of Norwegian flyers . . . that's right, isn't it, Doogan? Or were they sailors? Now then . . . Edgar Barker??? That must have been the tall, handsome Canuck, although the short happy one was just as friendly. They were all friendly—the salt of the earth! In fact, after a certain point, their hospitality made it impossible for me to write legibly. Anyway, it was all clean fun, as the wives who attended can attest; besides, one just couldn't be naughty in Toronto a/c the lid goes down at 7 P.M. Oh, it's a great town, and I'll want to go back. May I?

▼ ▼ ▼

Well, we've toured, talked business and played; have cemented friendships over an occasional cup. Let's eat! At the banquet, I was privileged to share wine with George Keller, a man who, in my opinion, the Society can't honor too much. He's a right guy. It was a wonderful dinner, interspersed with inspiring speeches and topped off with a wonderful stage show. You know, it takes Canada to rally the Tool Engineers; not one single Chapter failed to respond to the roll call. At that, it struck me as odd, for a moment, that another flag should precede the Stars and Stripes at the opening of ceremonies. One felt so thoroughly at home that it was hard to realize that, after all, we were but guests in a foreign if neighboring land. But then, in the work that is before us, we are as one; ours is as truly a Union as though it were confirmed by solemn covenant. We may not be formally in the war, but our tools are, and more are coming, and there are Americans, too impatient to wait, wearing the wings of the Canadian Air Force. And, I think that we are destined to be with you—all the way! And now, I believe that I can speak for all of the Yanks who attended the Convention: — Thanks, Canadians, for a welcome that warmed our hearts and for a fellowship that unites us in an enduring friendship. We'll drink to our common concept of the rightness of things. And now, gentlemen, break your glasses!

The New DUBLIFE Gauges



Illustrated above are the new improved DUBLIFE Gauges manufactured exclusively by us. The handle is made of hexagon material with bronze tapered collet which locks around the plug as it is driven into the handle. The plugs are reversible, thus giving "Dublife". Quick delivery from stock on gauges .030" to 1.000". Specify "UPPCO FINISH", "The last word in finish".

Write for catalog showing DUBLIFE and AGD Gauges, or use mailing card in this issue of THE TOOL ENGINEER.

"PLUG GAGE SPECIALISTS"

UNITED PRECISION PRODUCTS CO.

4617 W. HURON STREET CHICAGO, ILL.

IMMEDIATE DELIVERY

AUTOMATICS

Cleveland 1¼ to 2" Model A
Cleveland, 4½" Model M, Chucker, M.D.
1¾" Gridley 4-spindle Model F., SPD.
2¼, 3¼ and 4¼" Gridley single spindle
No. 22 New Britain

DRILLS

No. 1A Edlund H.S.B.B., 4 Spdl., Power Feed, M.D.
Assorted High Speed & Sliding Head
3½' Fosdick Radial, SPD.
5' Weston Hvy. Duty, Radial, M.D.

GRINDERS

Brown & Sharpe No. 3 Universal
6" x 20" Fitchburg, Plain
16" x 66" Landis Plain
Lapper, No. 15 Norton, M.D.

LATHES

Hendey Yoke Head, 12 x 5, 14 x 5 and 18 x 10'
24" x 10' Schumacher-Boye, Quick Change, C/S
8" Sundstrand Stub Lathe, M.D.

MILLING MACHINES

No. 3 & C.S. Becker Vertical
Brown & Sharpe No. 2 Universal, Cone

PRESSES

No. 74 & 75 Toledo Open Back
No. 2, 3, 4 & 5 PG Farracute Solid Back
No. 152D Cleveland, Dble. Crank 30 x 75" Bed, Tie Rod, Sgle. Geared, 4" shaft, 4" stroke, M.D.

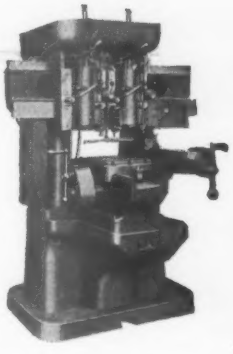
MACHINE TOOLS POWER PRESSES

OTT MACHINERY SALES INC.

546 Second Ave. Detroit, Mich.

MOREY No. 12M High Speed Vertical PROFILER MILLER

Preloaded Precision Bearings Throughout



Production of interchangeable parts requiring milling of any contour or outline can be materially speeded up by this Profiling and Milling Machine.

Ask for Circular No. 680-A

MOREY MACHINERY CO., Inc.
410 BROOME ST., NEW YORK

THE PASSING PARADE . . . .

Personals . . . Promotions . . . Deaths . . .

Clifford S. Stillwell, executive vice-president of the Warner & Swasey Company, was elected president of the National Machine Tool Builders' Association at the association's annual meeting in Chicago. He was elected to succeed Frederick V. Geier of the Cincinnati Milling Machine Company. Tell Berna, general manager of the association and Mrs. Frida F. Selbert, secretary of the association's national headquarters in Cleveland were re-elected and Richard H. Abbott was named assistant to Mr. Berna.

Robert H. Bahney, chief engineer of the Central Alloy District of Republic Steel Corporation, has been appointed chief engineer for the corporation and will make his headquarters in Cleveland.

James H. Richards and a group of Glendale, California business men recently purchased the Fray Machine Tool Company of that city. Mr. Richards has been general manager of the company, and is now president and general manager. The organization will continue to do business under the Fray name, and will be incorporated by the new owners.

Fray's Richards
The name is unchanged.

The Detroit Power Screwdriver company announces a new address at 2801 West Fort Street, Detroit, Michigan. The change will be effective around November 1st to 10th.

Two five-year scholarships to the Department of Mechanical Engineering of the University of Cincinnati were awarded by the Sheffield Corporation of Dayton, Ohio to two of its younger employees, Howard Gebhart and Carl L. Hoffmeyer, it was announced recently. The awards, known as the Elizabeth L. and O. M. Poock scholarships, valued at $2,000 each, were won in a series of competitive examinations open to all eligible employees of the corporation.

W. F. Kurfess, vice-president of Joseph T. Ryerson & Son, Incorporated, has been ordered to active duty in the U. S. Navy. He will leave for Washington shortly to take charge of the Steel Division of the Bureau of Ships, Navy Department. During the World War he served as a lieutenant on the U. S. destroyer Porter and continued his association with the Navy in the reserve force with the rank of lieutenant-commander.

YOU STILL GET ALL 3
We're working fast, building more and more Greenlee Automatic Screw Machines for defense work, but not too fast to make sure that every Greenlee turned off the assembly floor has been built right, to measure up to the highest standards of SPEED, ACCURACY, and QUALITY obtainable.
1. SPEED
Today the speed of the Greenlee Automatic . . . the speed designed and built right into every Greenlee Machine . . . is daily saving vital seconds on hundreds of defense jobs in Canada, England, and the United States.
2. ACCURACY
And accuracy is not sacrificed one bit to get this speed. Greenlee Automatics, built to stand the wear and tear of high-speed production, will meet your most rigid specifications and give continuous, uniform accuracy day after day.
3. QUALITY
Even in our hurry to build more Greenlees, there are no short cuts to quality. When this emergency has passed Greenlee Machines will still be turning out ordinary peace-time parts just as fast and just as accurately as they now produce defense work.
GREENLEE BROS. & CO.
ROCKFORD ILLINOIS

MULTI-UNIT
(GOVRO-NELSON)
DRILLING MACHINES
Special for the Job and Yet Universal
"HOLE"
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GRIP
LETTERS and FIGURES

Wedge Grip Stamps are a patented design which enables these stamps to give deeper and clearer impressions with a lighter blow.

Knurled sides assure operator a positive grip regardless of what substance may come in contact with the stamp or the operator's hand.

For the maximum of Safety and Efficiency use Safety Wedge Grip Stamps.

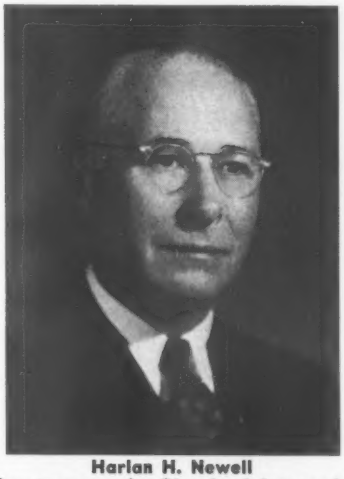
Write for circular and prices.

M. E. CUNNINGHAM CO.
169 E. CARSON ST. PITTSBURGH, PA.

—PASSING PARADE—

Announcement of the promotion of Duane Brice to the position of assistant treasurer of the Plomb Tool Company is made by R. W. Kerr, treasurer.

Election of Harlan H. Newell as treasurer and a member of the board of directors has been announced by the Cleveland Automatic Company. Mr. Newell, who assumed his new duties October 9, has been associated with the Society for Savings in Cleveland as investment analyst and since June, 1927, as vice president.



Harlan H. Newell
New treasurer for Cleveland Automatic.

Clayton R. Burt, president of Pratt & Whitney, Division Niles-Bement-Pond Company, recently distributed sixty-nine gold service emblems to employees who, during the last few months, have completed another decade of service. Pratt & Whitney recognizes 10, 20, 40 and 50 or more years of service with solid gold pins carrying varying numbers of diamonds. In all, 69 pins were issued representing an aggregate of 1290 years of service.

James W. Parker, vice-president and chief engineer of the Detroit Edison Company was elected by a letter ballot of the 15,000 members of the American Society of Mechanical Engineers to be president of the Society during 1942, according to the official announcement of the election results by C. E. Davies, secretary of the Society.

H. F. Robertson has been appointed district manager of the New England office and warehouse of Jessop Steel Company, succeeding the late Hugh A. Scallen.

Andrew J. Duncan, formerly associated with the Machine Tool Designing Company, announces the formation of his own Company, the Duncan Tool Designing Company, in Philadelphia. He will continue in the business of designing tools, jigs, fixtures, and dies.

The Armstrong-Blum Manufacturing

Consistent Quality

Our inspectors have no other duties.

To them a piece which is almost right, is still wrong.

NATIONAL TOOL SALVAGE CO.
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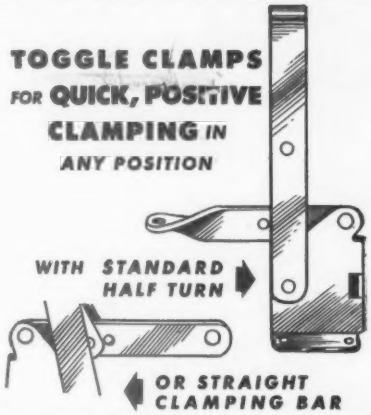
DANLY
KWIK-KLAMPS

TOGGLE CLAMPS FOR QUICK, POSITIVE CLAMPING IN ANY POSITION



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DANLY DIE SETS and DIE MAKERS' SUPPLIES

Company has appointed Gus M. Hess as general sales manager, and has recalled him to the home office. He is one of the Charter members of the New York-New Jersey chapter of the A.S.T.E. Ted. A. Slezak of the Ryerson Company has been appointed to succeed Mr. Hess as Eastern sales manager.

Mr. W. J. Greene, general sales manager of the L. S. Starrett Company, has been made vice-president in charge of sales.

R. J. Forkey has been appointed sales engineer for upper and western New York state by Norton Company. Mr. Forkey has been connected with the research laboratories and the sales engineering department at the Worcester plant.

The appointment of C. F. Bulotti Machinery Company of San Francisco as agents for Kent-Owens Milling Machines in that territory, has been announced by Edmund E. Burke, sales manager of the company.

Frank A. Burnett has been transferred to the Indianapolis office of Ampco Metal, Incorporated. Mr. Burnette was previously with the Cincinnati office.

At a recent meeting of the Board of Directors of the Greenfield Tap and Die Corporation Mr. Harry L. Bill of Dayton, Ohio was elected vice-president and general manager to succeed Mr. Howard M. Hubbard, recently resigned. Before coming to Greenfield, Mr. Bill reorganized and managed the United Aircraft Products, Incorporated, of Dayton. where he was president and general manager from August, 1939 until he resigned to come to Greenfield.

Harry L. Bill
At Greenfield, the general manager.

Died

Archibald Graham Montgomery, assistant chief engineer for the American Steel & Wire Company, died October 10 at the age of 53. Mr. Montgomery was a native of Volga City, Iowa. He was graduated from Pennsylvania State College in 1911. Three years later he was employed by the American Steel & Wire Company as district engineer. He came to Cleveland 16 years ago as master mechanic in the old Central Furnace Division of the company. Later he was made general mechanical superintendent of the steel division. He had held his present post for the last two years.

Ralph L. Little, supervisor of the production department of the Cleveland City Forge Company, died suddenly October 15 at his home. He was 50. Before coming to Cleveland in 1923 Mr. Little worked for the Cambria Steel Company in Johnstown, Pennsylvania, and the Arsenal Bank in Pittsburgh.

Henry Buker, 67, vice-president of the Browne & Sharpe Manufacturing Company, died in a hospital after a short illness. Mr. Buker was chairman of the NRA code authority for the industry in 1933 and was a member of the industry's committee dealing with national defense problems.

John A. Farnum, 63, treasurer and

BLANKING
PIERCING
FORMING
DRAWING
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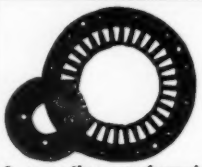
EXTRUDING

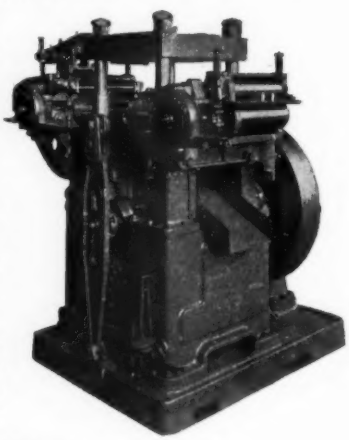


8 operations performed at every stroke produce 4800 completed shells per hour from .050" steel with 1¾" draw.

Motor rotor and stator laminations produced simultaneously from strip of .025" silicon steel.

Left: Airplane fuselage hinge of duralumin produced complete per stroke in continuous strip to precision limits, including BROACHING OPERATION.

Dieing Machines are setting new highs for production and new lows for cost on an amazing variety of stampings. Regardless of intricacy involved or accuracy required, this unique stamping machine comes through with a standard of performance that knocks 60% to 90% off previous stamping costs and holds product to accuracy of .0002" when needed. For now, and for any time in the business cycle, these machines PAY HANDSOME DIVIDENDS. Capacities: 10 tons to 300 tons. Speeds up to 600 s.p.m. producing 1 to 20 COMPLETED parts per stroke.



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DIEING MACHINES

T. H. L. FRONT LEVER

BENCH PUNCH

Built for hard tough work — die cannot lose alignment with punch — all parts interchangeable.

Capacity ½" holes through ⅛" steel; 11/32" through ¼" steel. Can also be made for holes up to ⅜" in thinner metal. Stock punches and dies available from ⅛" to ½" by 64ths.

Weight, 70 lbs.

PRICE WITH ONE PUNCH AND ONE DIE—

$50.00

Immediate Shipment

T. H. LEWTHWAITE MACHINE CO.

(Est. 1890)

307 E. 47 St. NEW YORK

—PASSING PARADE—

general manager of Parker Metal Goods Company, Worcester, Massachusetts, died suddenly at his home. He had been associated with the company five years.

Joseph Guy Stevens, 61, former treasurer of the Greenfield Machine Company, died at a hospital in Warwick, Massachusetts.

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NOVEMBER MEETINGS

BALTIMORE — Nov. 5. 8:00 P.M. Sears Roebuck Auditorium. W. P. Powers, secretary, U. S. Tool Co., Inc., Ampere, N. J., will talk on "Multi-Slide and Multi-Milling Machines." Reservations: Leslie MacGregor, 501 Hollen Road, Baltimore.

BOSTON—Nov. 27, Dinner at 6:30 P. M. Technical session 8:00 P.M., room 6-120, Walker Memorial Bldg., M.I.T. Frank O. Hoagland, Master Mechanic, Pratt & Whitney Division, Niles-Bement-Pond Co., will speak on "Machine Tool Design."

BUFFALO - NIAGARA — Nov. 20. 6:30 P.M. University Club, Buffalo. Speaker: H. A. Frommelt, Kearney & Trecker Corp. Subject: "Plastics in Defense." Reservations: Claire W. Crofoote, 76 Pearl Street, Buffalo.

CHICAGO—Nov. 3. Dinner at 6 P.M. (Midwest Athletic Club), $1.25 per plate. 50c adm. to technical session for non-members. Speaker: H. L. Heywood, standards engineer, Kearney and Trecker Corp. Subject: A talk on the part Plastics are playing in the present emergency, illustrated with a sound movie.

DAYTON—Nov. 10. Gibbons Hotel. Speaker: Mr. Furan, Federal Bureau of Investigation. He will give a talk together with a talking motion picture. "You Can't Get Away With It."

GREATER NEW YORK — Nov. 3. 8:00 P.M. Hotel New Yorker. Speaker: F. T. Ellis, Heald Machine Co. Subject: "Precision Boring and Precision Finishing of Surfaces."

HAMILTON — Nov. 13. 7:00 P.M. Welland House, St. Catharines, Ont. Speaker: F. B. Bowman. Subject: "Jewels of Industry."

HARTFORD — Dec. 1. 8:00 P.M. Hartford Gas Co. Auditorium. Speaker: John Milea, Babson Institute. Subject: "Management Problems." Reservations: Henry Rockwell, Hamilton Std. Prop. Div., United Aircraft Corp., East Hartford, Conn.

HOUSTON — Nov. 17. 6:00 P.M. Houston Country Club. Speaker: Frank W. Curtis, Pres., A.S.T.E. Subject: "Tools and Tooling." The American Society of Metals has been invited to the dinner and technical session.

PHILADELPHIA — Nov. 20. 6:30 P.M. Dinner. Engineers Club of Philadelphia. Speaker: W. P. Powers, Secretary, U. S. Tool Co. Inc., Ampere, N. J. Subject: "Multi-Slide Presses and High Production Millers." Illustrated with motion pictures. The dinner speaker will be announced.

PITTSBURGH—Nov. 7. 6:30 P.M. McCann's Dining Room. Speaker: H. A. Frommelt, Kearney & Trecker Corp.

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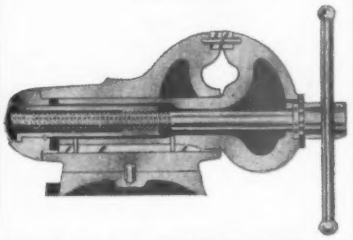

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RACINE—Nov. 10. 6:30 P.M. Hotel Racine. Speaker: H. E. Linsley, Tool Designer, Wright Aeronautical Corp. Subject: "Manufacture of Wright Aviation Engines." Reservations: Must be in by Sat. noon Nov. 8 to John Pritchard, secretary, 1602 Wisconsin Ave.

ROCHESTER—Nov. 12. Dinner 6:30 P.M. Meeting at 7:45 P.M. University of Rochester. Dinner at Todd Union, Talk at Lower Strong Auditorium. Speaker: H. A. Frommelt, Kearney & Trecker Corp. Subject: "Machining of Plastic Molds." Reservations: C. G. Newton, Stone 2893.

ROCKFORD—Nov. 6. 6:00 P.M. Hotel Faust. Speaker: H. E. Linsley, Production Dept., Wright Aeronautical Corp. Subject: Five educational reels on "Motor Manufacture."

SCHENECTADY—Nov. 13. 6:30 P.M. Troy, N. Y. Speaker: W. H. Oldacre, Vice Pres. and Research Engineer, D. A. Stuart Oil Co. Subject: "Cutting Oils and Lubricants." Reservations: N. Y. Coxe, room 235, Bldg. 41, G. E. Co.

SOUTH BEND—Nov. 4. Dinner 7:00 P.M., Technical session 8:00 P.M. Indiana Club. Speakers: G. F. Weber, Vocational Director of the South Bend High Schools, and H. E. Linsley, Production Dept., Wright Aeronautical Corp. Subjects: Mr. Weber will speak on "Defense Training in South Bend." Mr. Linsley will show the talking picture: "Wright Airplane Motor Production," and will comment on it. Reservations: Glave S. Bunch, Jr.

SPRINGFIELD, MASS.—Nov. 10. 6:30 P.M. Highland Hotel. This will be "Executives Night." Speaker: Ralph A. Flanders, President of Jones & Lamson Machine Co. Subject: "The Tool Engineer and National Defense." Various leading industrialists from Western Massachusetts will give short talks.

ST. LOUIS—Nov. 18. 6:30 P.M. Melbourne Hotel, Grand and Lindell Blvd. Speaker: Frank W. Curtis, A.S.T.E. President.

SYRACUSE—Nov. 11. Deauville Hotel, Owasco Lake, Auburn, N. Y. Speaker: W. H. Oldacre, Vice President and Research Engineer, D. A. Stuart Oil Co. Also a film on "Motion Economy," taken by General Motors at Saginaw Steering Gear Division, will be shown.

TRI-CITIES—Nov. 5. 6:30 P.M. Harper House, Rock Island, Illinois. Speaker: J. C. Fox, Chief Metallurgist, Doehler Die Casting Co. Subject: "Die Castings." Reservations: L. J. Rodgers, c/o Deere & Mansur Works, Moline, Illinois.

TWIN STATES—Nov. 12. 6:30 P.M. Masonic Temple. Speaker: F. T. Ellis, Heald Machine Co., Worcester, Mass. Subject: "Diamond Boring."

WORCESTER—Nov. 5. Dinner 6:30 P.M. Sanford Riley Hall. Speaker: J. G. Magrath, Applied Engineering Dept., Air Reduction Sales Corp. Subject: "Oxy-acetylene Surface of Steel."

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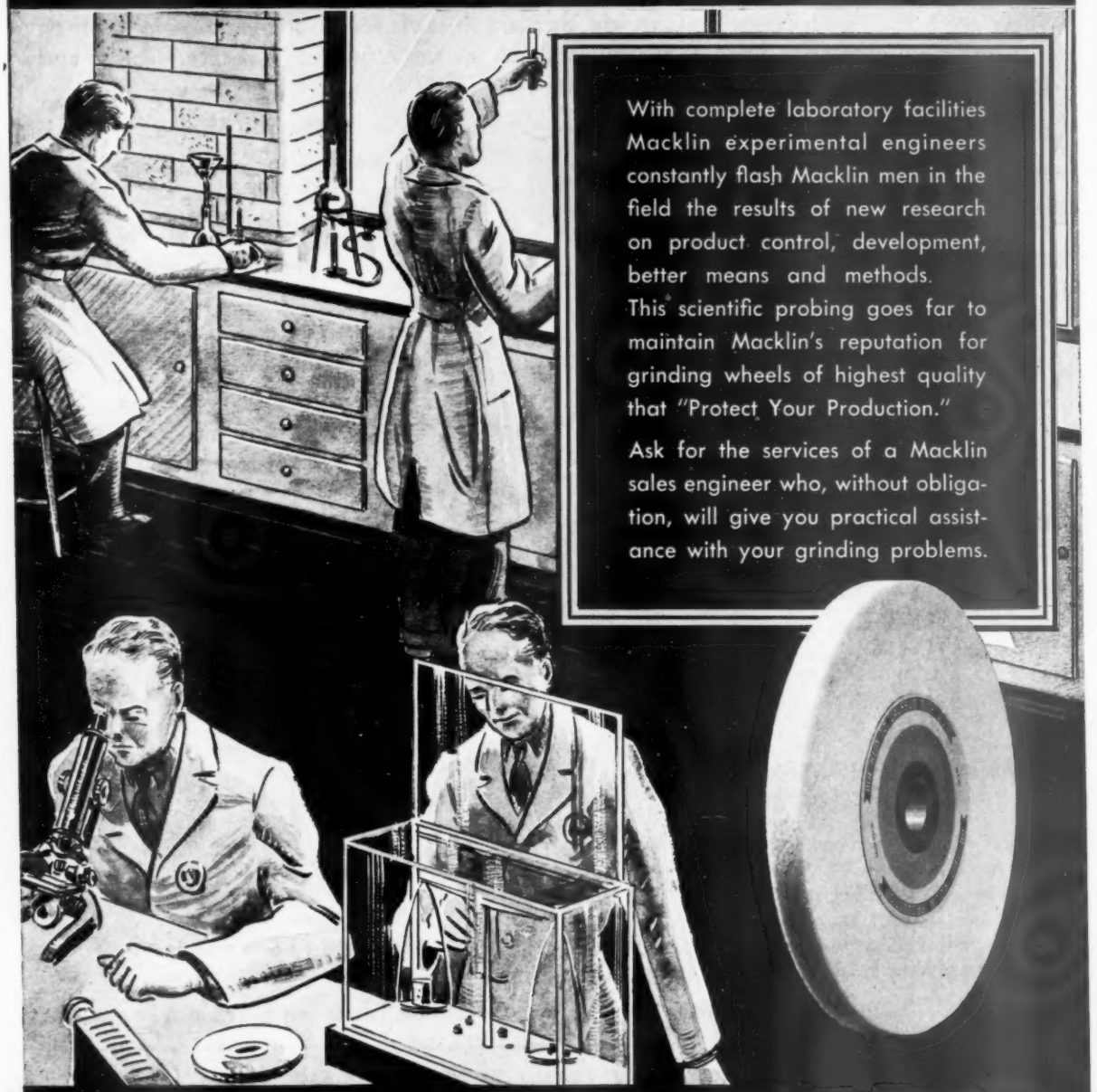

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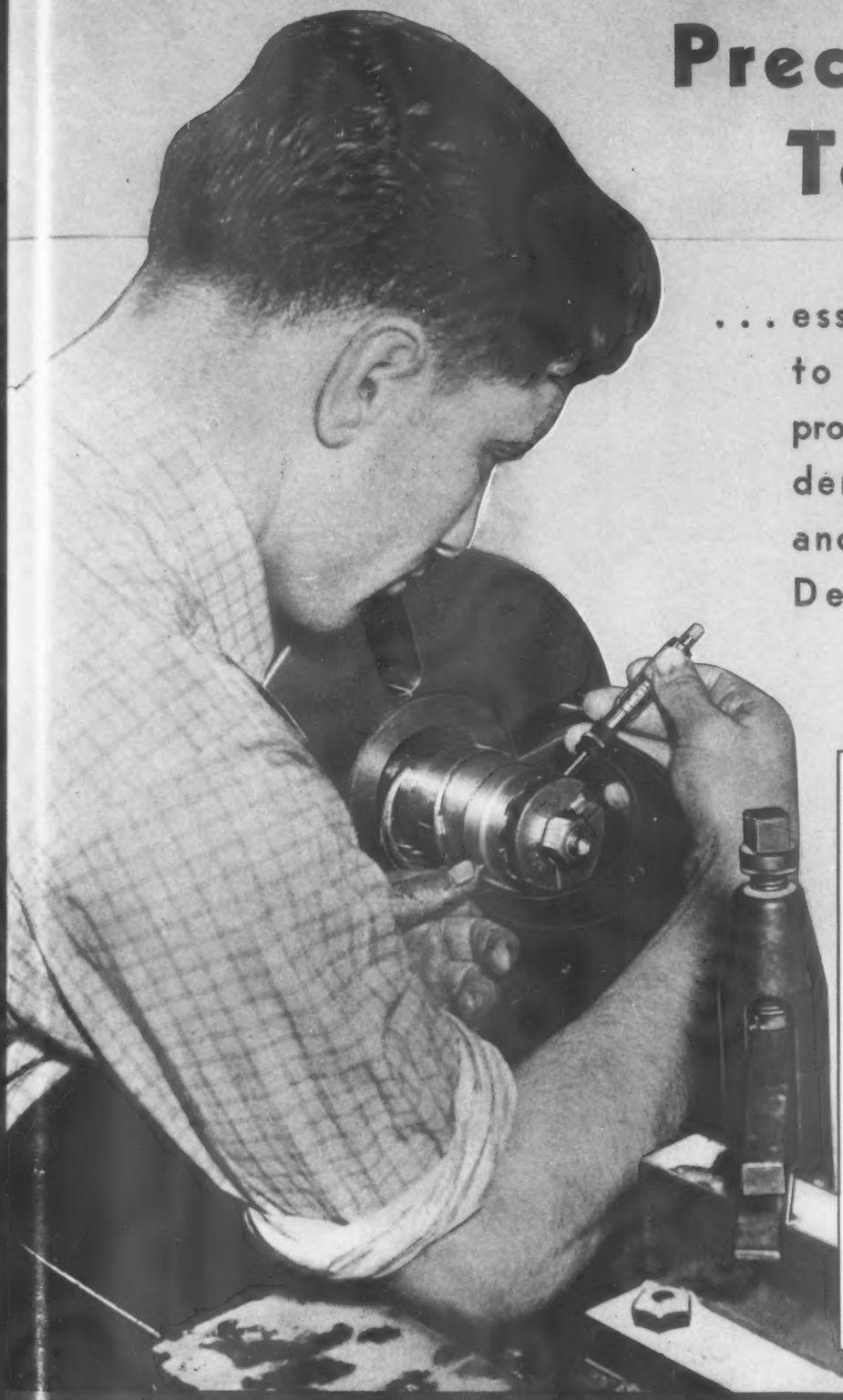

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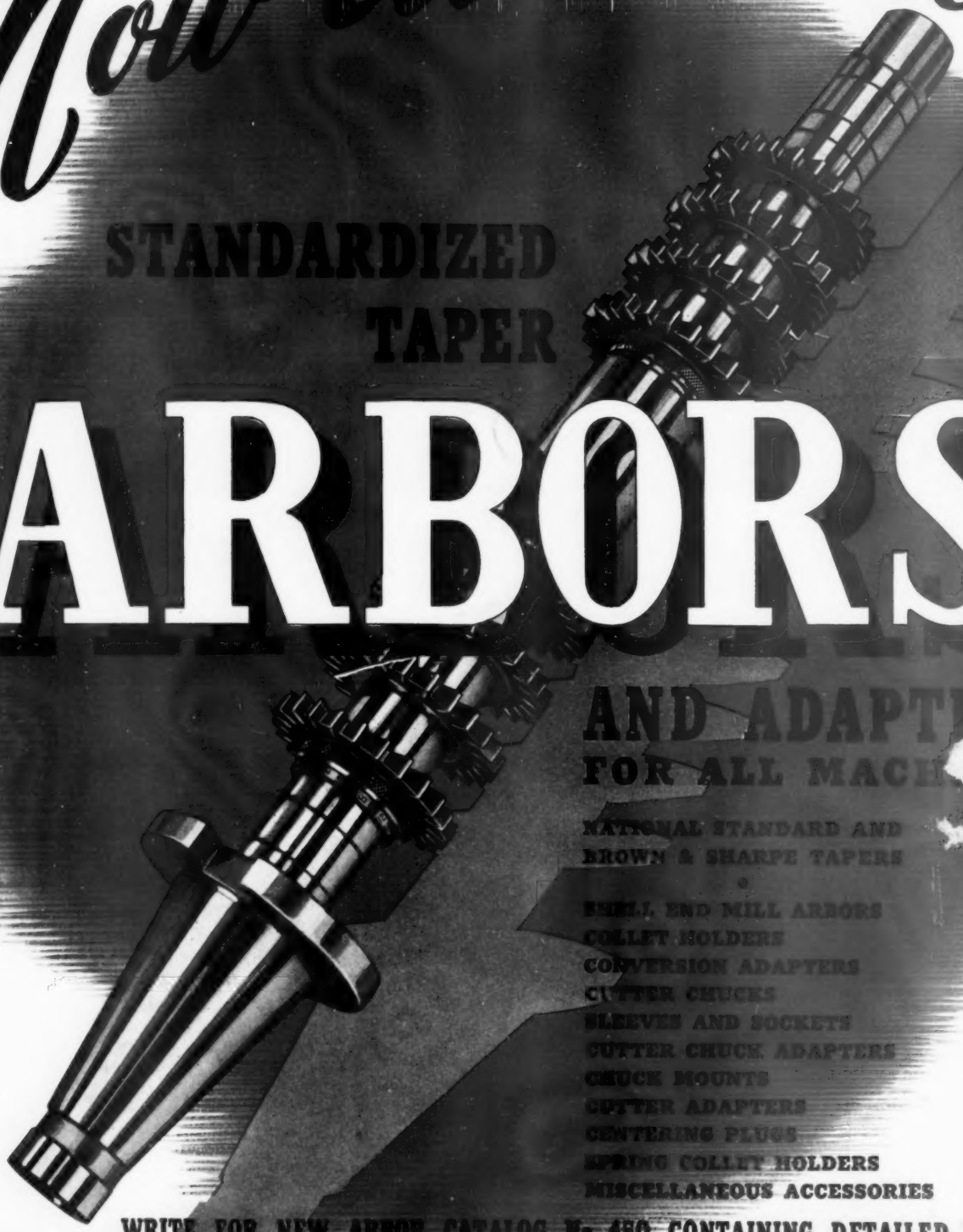

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